

AGRIBUSINESS FOR AFRICA'S PROSPERITY



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

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Editors

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UNIDO ID/440
Sales No.: E.11.II.B39

ISBN: 978 92 1 106446 9
e-ISBN: 978 92 1 054827 4

Cover design by Excelsis Sàrl, Switzerland.

Layout by Smith + Bell Design (UK).

Printed in Austria, May 2011.

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Preface

African economic growth remains largely commodity-based on exports of oil, minerals and agricultural commodities with little or no processing involved. In order to accelerate sustainable and inclusive growth and development in Africa there is an urgent need for fostering a new development approach based on exploiting the full agribusiness potential of the continent. This could focus on increasing agro-industrial value added and employment along the entire agribusiness value chain in agriculture, industry and services. This book analyses the challenges, the potential and opportunities of African agribusiness in the current period of dramatic changes in global agro-industrial markets, and builds a strong case for agribusiness development as a path to Africa's prosperity.

The book was inspired by discussions within the United Nations Industrial Development Organization (UNIDO) and with renowned international experts on the subject. It is based on a comprehensive study to fill what UNIDO perceives as a substantial gap in the knowledge of agribusiness development. This initiative is consistent with the *Strategy for the Implementation of the Plan of Action for the Accelerated Industrial Development of Africa (AIDA)* adopted by the Conference of African Ministers of Industry in Durban in October 2008, and the *African Agribusiness and Agro-industries Development Initiative (3ADI)* endorsed by the High-level Conference on the Development of Agribusiness and Agro-industries in Africa, held in Abuja in March 2010.

The idea was elaborated in an Expert Group Meeting on *Adding value to Africa's agro-industry and trade*, organized by UNIDO in Vienna, in June 2009, which brought together international experts from universities, United Nations agencies and agribusiness practitioners to brainstorm on the topic. Following this, a number of background papers and country case studies from Cameroon, Ethiopia, Kenya, Mali, Nigeria, Senegal, South Africa and Zambia were commissioned from renowned international experts, and these contributions form the substance of the book.

The book comprises three parts: Part A outlines the current status of agribusiness and agro-industrial activities in Africa, in an historical and global context. It analyses the rationale for diversified and socially-inclusive growth through agribusiness development, along with the key determinants for fostering agribusiness value chain development. The seven chapters constituting Part B of the book analyse the seven development pillars for agribusiness development, in terms of enhancing agricultural productivity; upgrading value chains; exploiting local, regional and international demand; strengthening technological effort and innovation capabilities; promoting effective and innovative financing; stimulating private participation; and improving infrastructure and energy access. This analysis is followed by an agenda for action in Part C, with a key focus on visions, policies, strategies and institutions for Africa's agribusiness development and the way forward towards converting plans into action.

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Acknowledgements

This book has been prepared under the technical guidance of Kandeh K. Yumkella, Director-General of the United Nations Industrial Development Organization. The editors, Patrick M. Kormawa, Torben M. Roepstorff and Anthony M. Hawkins were responsible for the drafting and overall substantive editing of the manuscript. The guidance of Torben M. Roepstorff, UNIDO Senior Economic Advisor to the project, during the entire process is greatly appreciated.

The editors wish to acknowledge the collaboration and technical inputs provided by the contributors and authors, who participated in the conceptualization and drafting of various book chapters and their review: John C. Anyanwu, Murefu Barasa, Nicola Cantore, Jean Devlin, Anthony M. Hawkins, Abdul B. Kamara, Gil Seong Kang, Patrick Kormawa, Franklyn Lisk, Stefano Ponte, Torben M. Roepstorff, John Staatz, Dirk Willem te Velde, Steve Wiggins, Timothy O. Williams and Karl Wohlmuth. A special word of appreciation is due to these contributors for their commitment to the project and for their readiness to promptly react to editorial comments.

Special thanks are due to the peer reviewers of the manuscript, Eric Tollens, Professor Emeritus of Agricultural and Food Economics at Catholic University of Leuven, Belgium; and Colin McCarthy, Professor Emeritus in Economics at the University of Stellenbosch, South Africa. They carefully analysed the draft and provided valuable feedback, comments and suggestions. Also thanks to Jebamalai Vinanchiarachi, Senior Research Fellow, Department of Development Studies, University of Malaysia, Kuala Lumpur, Malaysia; and Anthony Ikpe, Professor of Agricultural Economics, Department of Agricultural Economics, University of Ibadan, Nigeria, for valuable inputs to selected parts of the study.

The editors are also grateful to UNIDO technical staff who lent time and effort to review individual chapters and case studies: Philippe Scholtès, Director Agribusiness Development; Ludovico Alcorta, Director, Research and Statistics; Mohamed

L. Dhaoui, Director, Business, Investment and Technology Services; Lalith Goonathilake, Director, Trade Capacity Building; Fatou Haidara, Director, Special Programmes; Sarwar Hobohm, Director, Organizational Strategy and Coordination; Frank Hartwich, Michele Clara, Anders Isaksson and Matilda Muweme, Industrial Development Officers; Stefano Bologna and Frank Van Rompaey, UNIDO Representatives in Cameroon and South Africa, respectively.

The editors wish to acknowledge the efforts of Jean Devlin for her dedication and editorial and technical support at all stages, Ludovico Alcorta for shepherding the manuscript through the publication process, and Chuma Ezedinma, Agricultural Economist, for his inputs on infrastructure and energy.

The Editors

Vienna

February 2011

Foreword

For centuries, agriculture has driven economic growth in countries across the globe, and African nations are following the same path out of poverty. With agriculture accounting for 65 per cent of the continent's employment and 75 per cent of its domestic trade, it is likely to drive Africa's economic growth for years to come. Smallholder farmers will be the backbone of that effort.

New and evolving markets hold the promise of greater profits for smallholder farmers. Feeding the rapidly growing urban population will require more and higher quality agricultural commodities. Urban consumers will also increase demand for processed agricultural products, so adding value to farmers' outputs will take centre stage in years to come. This will provide lucrative opportunities not just for the women and men who grow the food, but for a wide range of rural workers, especially the emerging generation of young people.

A key first step in exploiting these opportunities is recognizing smallholder farms as agribusinesses, regardless of their size or scale. Unfortunately, too many small agribusinesses in Africa are neither productive nor profitable. There are two significant reasons why they remain trapped in a cycle of subsistence. First, their yields are too low to generate marketable surpluses, because they lack access to modern technology and productive assets. Second, farmers cannot get their produce to markets, because of the lack of roads and linkages between farm-level production and downstream activities, such as processing and marketing. African agriculture and agribusiness must be transformed to meet the demands of the twenty-first century, and this book outlines the critical ingredients. UNIDO brought together some of the best minds in the field to analyse what is needed for agribusiness to serve as the path to Africa's prosperity. Their thinking led to the findings and recommendations covered in these pages. From our vantage point at the International Fund for Agricultural Development (IFAD), we can clearly see the value in the initiatives carried out by UNIDO in this area, and we are pleased to have UNIDO as a collaborative partner.

The book identifies seven pillars of agribusiness development, the actions needed to transform subsistence agriculture into productive agribusiness: enhance productivity, upgrade value chains, exploit demand, strengthen technology, promote innovative sources of financing, stimulate private sector participation, and improve infrastructure and access to energy. Building on these pillars, it lays out an agenda for action and a practical framework to guide efforts by the entire range of stakeholders.

I believe we need to spark an agribusiness and agro-industrial revolution for the benefit of rural areas. Such a revolution will bring sustained investment in the entire agribusiness value chain, which, in turn, will raise productivity and yields, improve competitiveness and increase profits. By implementing the thoughtful, practical ideas reported in this book, we can indeed use agribusiness to create prosperity for Africa and that means prosperity for the women and men who feed the continent's people.

Dr. Kanayo F. Nwanze
President, IFAD

Explanatory notes

References to dollars (\$) are to United States dollars, unless otherwise specified.

The following abbreviations and acronyms appear in this publication:

3ADI	African Agribusiness and Agro-industries Development Initiative
AfDB	African Development Bank
AGOA	African Growth and Opportunity Act
AIDA	Accelerated Industrial Development of Africa
AMCOST	African Ministerial Council on Science and Technology
AUC	African Union Commission
CAADP	Comprehensive Africa Agriculture Development Programme
CDM	Clean Development Mechanism
CFA	Communauté financière africaine
COMESA	Common Market for Eastern and Southern Africa
DAC	Development Assistance Committee
DFI	development finance institution
DTIS	Diagnostic Trade Integration Studies
ECA	Economic Commission for Africa
ECOWAS	Economic Community of West African States
EBA	Everything But Arms
EPA	economic partnership agreement
EPZ	export processing zone
FAO	Food and Agriculture Organization of the United Nations
FDI	foreign direct investment
GDP	gross domestic product
GHG	green house gases

GHP	good hygiene practices
GMP	good manufacturing practices
GNP	gross national product
GSP	Generalized System of Preferences Agreement
HACCP	hazard analysis and critical control points
ICT	information and communications technology
IEA	International Energy Agency
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IFPRI	International Food Policy Research Institute
ILO	International Labour Organization
IMF	International Monetary Fund
ISIC	International Standard Industrial Classification
ISO	International Organization for Standardization
ITC	International Trade Centre
LDCs	least developed countries
LLCs	land locked countries
MDGs	Millennium Development Goals
MFA	Multifibre Arrangement
MFN	most-favoured nation
MNC	multinational corporation
MVA	manufacturing value added
NEPAD	New Partnership for Africa's Development
NGO	non-governmental organization
NICs	newly industrializing countries
NIS	national innovation system
NTB	non-tariff barrier
ODA	official development assistance
OECD	Organization for Economic Co-operation and Development
PPP	public-private partnership
PSD	private sector development
R&D	research and development
REC	regional economic communities
RTA	regional trade agreement
SADC	Southern African Development Community
SEZ	special economic zone
SITC	Standard International Trade Classification
SME	small and medium-sized enterprise
SPS	sanitary and phyto-sanitary measures
SSA	sub-Saharan Africa
STI	science, technology and innovation
SWF	sovereign wealth fund
TBT	technical barriers to trade
TFP	total factor productivity
TNCs	transnational corporations

UEMOA/WAEMU	West African Economic and Monetary Union [Union économique et monétaire ouest-africain]
UN COMTRADE	United Nations Commodity Trade Statistics Database
UNCTAD	United Nations Conference on Trade and Development
UN DESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
VAT	value added tax
WDI	World Development Indicators
WEF	World Economic Forum
WTO	World Trade Organization

Part A: African agribusiness: Retrospects and prospects in a global setting

1. New global realities governing agribusiness

Torben M. Roepstorff and Steve Wiggins

1.1 The setting

Sub-Saharan Africa's robust economic growth since the late 1990s was briefly interrupted by the global recession (2008/9), leading to marginal decline in per capita income in 2009 for the first time since 1994. However, economic growth is forecast to resume its upward trajectory during the recovery phase, with growth (GDP) *per capita* rising to 2.5 per cent in 2010 and 3.0 per cent by 2011 (World Bank 2010a)—though it is still too early to say whether the region's vastly improved economic growth performance in recent years will be translated into a healthy phase of economic transformation and sustainable development.

Three main factors explain recent improvement in growth performance. These are (a) much stronger macroeconomic policies, as reflected in reduced budget deficits, healthier external payments balances, lower inflation, slower monetary growth and an enhanced investment climate; (b) the post-2002 surge in commodity prices, allied with the expansion of oil production, and (c) substantially higher inflows of foreign capital, especially, but not only private capital, and most notably foreign direct investment (FDI).

While the primacy of growth is central to rapid economic transformation, in Africa the relatively good growth performance has seen many more millions get caught in the poverty trap due largely to the lack of diversification of sources of growth, including a continued over-reliance on primary commodity exports. It is critical to embark on a vigorous course of value addition to Africa's huge reservoir of agricultural resources in order to harness growth for development. Economic performance and the impact on poverty in the continent have shown that prosperity is not only due to resource endow-

ments, and that poverty is not due to the lack of resources. Several African resource-rich countries have remained poor, while other resource poor countries have become rich by climbing the ladder of value addition. Such developments demonstrate that prosperity and poverty are the results of policy choices. Seizing emerging opportunities for promoting agribusiness in the new global context is imperative for Africa's prosperity¹.

As the world's poorest region, with half of its population living in extreme poverty on less than \$1.25 a day (World Bank & IMF 2010), sub-Saharan Africa (SSA) is behind the curve in terms of industrialization with manufacturing accounting for 15 per cent of GDP. This compares with 22 per cent for middle-income countries as a whole and 33 per cent in East Asia (Table 1.1).

The linkages between manufacturing and income per capita run both ways—African incomes are low because the continent is under-industrialized, but manufacturing is a lagging sector because the poverty headcount is high. Table 1.1 shows that Africa's economies have not diversified into manufacturing and that the growth of industry's share in GDP, as distinct from manufacturing, reflects growing dependence on primary activities, especially oil and mining—a trend underscored by export data showing that in the 2005–2007 period fuels and mining products accounted for more than two-thirds of exports from SSA compared with 8.5 per cent for agriculture and 19 per cent for manufactured goods (WTO 2008).

	Agriculture		Industry		Manufacturing		Services	
	1995	2008	1995	2008	1995	2008	1995	2008
Low-income	35	26	22	28	12	14	43	47
Middle-income	14	9	35	37	23	22	51	53
High-income	2	1	30	26	20	17	68	73
<i>Low and middle-income regions</i>								
East Asia & Pacific	19	12	44	44	31	33	36	41
Europe & Central Asia	13	7	36	32	22	18	56	61
South Asia	26	18	27	28	17	16	46	53
Latin America	7	7	29	33	19	18	64	61
Middle East & North Africa	16	11	34	43	15	12	50	46
Sub-Saharan Africa	18	12	29	33	16	15	53	55

Source: World Bank (2010b)

Manufacturing is a dynamic force in economic development. While developing countries as a whole have increased their share of world manufacturing value added from 19.6 per cent in 1995 to 33.6 per cent in 2009, mainly due to East Asia (China in particular), Africa's share remained marginal at only 1.2 per cent, half of which is produced in a single country, South Africa.

1. While the analysis in this book pertains to the whole continent of Africa, there is a broad-based distinction drawn between sub-Saharan Africa, and North Africa, on the basis of distinct patterns of economic and agribusiness development that are discernible in both regions.

At the level of per capita incomes prevailing in low and middle-income developing countries in SSA, the income elasticity for manufactures will remain very high and greater than for agriculture, while being more or less similar to that of services (Dasgupta & Singh 2006)². In low and middle-income developing countries, manufacturing has historically served as an engine of GDP growth, where the share of manufacturing in GDP remained at a very high level of 24 per cent³ in 2007, mainly due to industrialization in East Asia (World Bank 2010b).

The plight of Africa's agribusiness in the global setting

In sub-Saharan Africa manufacturing has been growing at a slower rate than overall GDP since 1990 suggesting delayed industrial take-off and premature de-industrialization in some countries. Premature de-industrialization, triggered in part as a consequence of the structural adjustment policies that tackled unsustainable industrialization paths, is nonetheless a worrying sign since it implies that surplus labour either remains in low-productivity agriculture or shifts to low-productivity informal manufacturing or service activities. Accordingly, manufacturing has not served as a dynamic source of growth in SSA as it has done in other developing regions, primarily due to weak industrial capabilities, inadequate institutions and infrastructure constraints.

Against this background, what role can agribusiness (defined in Box 1.1) play in the development of Africa? The question demands an urgent answer for three main reasons. First, although economic growth since 1995 has been stronger than in the preceding two decades, absolute poverty in the region continues to increase. In 1990, the baseline for the Millennium Development Goals (MDGs), 295 million people in sub-Saharan Africa were estimated to be living on less than \$1.25 a day, a number that had risen to 388 million by 2005. The corresponding figure for \$2 a day had risen from 390 million to 555 million.⁴ Second, from these data it is clear that not only is growth inadequate to reverse this trend but also that the pattern of growth—largely dependent on capital-intensive, resource-depleting energy and mining expansion—has failed to produce the desired “trickle down” effects necessary to reduce the poverty headcount. Third, most Africans live in rural areas and agriculture remains the single largest source of employment and income. Agriculture contributes 15 per cent of GDP, almost two thirds of total employment (64.7 per cent), and accounts for more than 75 per cent of domestic trade by value providing a livelihood for the majority of the economically active population. Agriculture plays an even more dominant role in the lives of the poor, who continue to be primarily rural and either directly engaged in farming, or dependent on activities connected to it (World Bank 2007a).

2. Dasgupta & Singh (2006) have examined structural transformation in selected developing countries for the period 1990-2000 in the context of a Kaldorian approach.

3. At high levels of *per capita* income the share of manufacturing in GDP starts to fall, implying that other sectors, particularly services, grow faster. The turning point for a declining share of manufacturing output and employment is now happening at a much lower *per capita* income than in today's developed countries, estimated at \$3,000, compared with almost \$10,000 in the past in some countries (see also Rowthorn & Coutts (2004); Palma (2005); and Pieper (2003)).

4. The proportion of people living in poverty has fallen a little, from 57.6 per cent to 50.9 per cent for the \$1.25 a day benchmark and from 76.0 per cent to 72.9 per cent for the \$2 a day benchmark. This reduction, however, is much slower than the rate of progress necessary to reach the target of halving poverty by 2015 (World Bank 2009b).

Fortunately, there are indications that in some African countries agricultural growth and productivity improvements have been accelerating over the last one or two decades. Following several decades of relative neglect by governments and donors, there is an emerging consensus that more determined efforts must be made to develop African agriculture through increased intervention and investment. Both will be needed to accelerate economic growth and poverty reduction, while contributing to achieving the broader MDGs.

As an economy develops over the long term, the share of agriculture in both GDP and employment declines. This process has long been apparent in SSA where agriculture's share of GDP has fallen from 43 per cent in 1965 to 12 per cent in 2008 (World Bank 1989; World Bank 2009a), implying that there is little room for agriculture—narrowly-defined as crop and livestock production—to drive output growth and poverty reduction. However, agriculture's contribution will be enhanced substantially by strengthening linkages with industry, through agro-processing and value-addition downstream of farms, in the provision of farm inputs upstream, and in improved post-harvest operations, storage, distribution and logistics that are essential elements of agribusiness value chains (Box 1.1). This offers a route to economic growth and poverty reduction, as well as the structural transformation of economies and the improvement of technical skills and capacity. Wilkinson & Rocha (2009) have shown empirically that the ratio of GDP generated by agribusiness to that generated by farming increases from 0.57 for a sample of nine “agriculturally-based countries” (all in SSA) to 1.98 for a set of eleven “transforming countries” (mainly Asian) and to 3.32 for twelve “urbanized countries”. For the United States, the ratio stands at 13. While in agricultural countries that have not undergone structural transformation, 63 per cent of the value added in the agrifood system was created on the farm, in the US, farming accounted for only 7 per cent. Input producers, agro-industry, trucking firms, restaurant employees, and others created the rest of the value added in the US agrifood system, implying that agribusiness is significantly important for value addition and economic prosperity.

Patterns of global agro-industrial and agribusiness production

Globally, agro-industrial activities represent a substantial share of overall manufacturing value added (MVA), accounting for 14 per cent of total MVA in industrial countries and 27 per cent in emerging markets⁵ (UNIDO 2009a).

The shares of agro-industry in total manufacturing value added differ significantly between regions and at national levels. Among industrialized countries, the United States has the lowest overall percentage of value added (9.4 per cent), less than half that of the EU-12 (24.6 per cent)⁶. Within the developing world, there is a wide disparity between the newly industrializing countries⁷ (NICs) where agro-industry accounts for 26 per cent of MVA, whereas agro-processing industries

5. In contemporary economic development literature the terms emerging markets and developing countries are used interchangeably to refer to economies undergoing structural transformation.

6. EU 12 refers to EU member states during the period 1986-1994. This includes Belgium, France, Germany, Italy, Luxembourg, Netherlands, Denmark, Ireland, United Kingdom, Greece, Portugal and Spain.

7. NICs refers to Brazil, China, India, Malaysia, Mexico, Philippines, South Africa, Thailand and Turkey.

Box 1.1: What is Agribusiness?

Agribusiness is a broad concept that covers input suppliers, agro-processors, traders, exporters and retailers. Agribusiness provides inputs to farmers and connects them to consumers through the financing, handling, processing, storage, transportation, marketing and distribution of agro-industry products and can be decomposed further into four main groups:

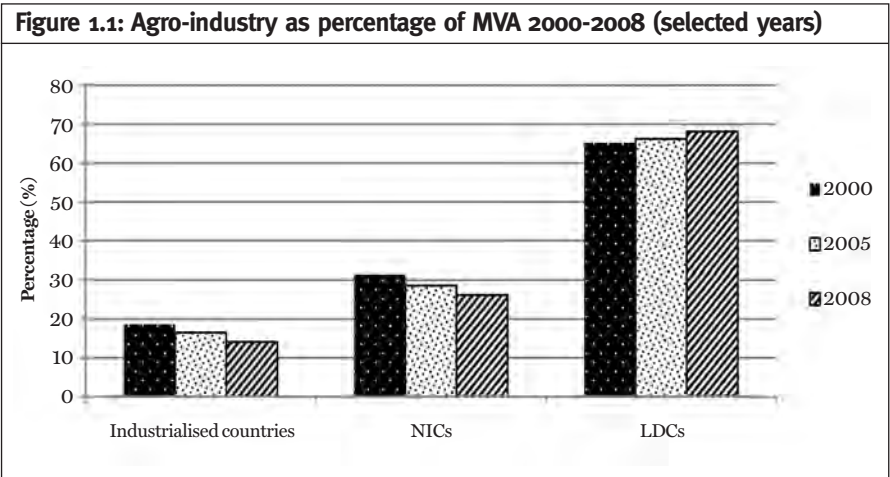
1. Agricultural input industry for increasing agricultural productivity, such as agricultural machinery, equipment and tools; fertilizers, pesticides, insecticides; irrigation systems and related equipment;
2. Agro-industry: Food and beverages; tobacco products, leather and leather products; textile, footwear and garment; wood and wood products; rubber products; as well as construction industry products based on agricultural materials;
3. Equipment for processing agricultural raw materials, including machinery, tools, storage facilities, cooling technology and spare parts;
4. Various services, financing, marketing and distribution firms, including storage, transport, ICTs, packaging materials and design for better marketing and distribution.

Agribusiness is thus a term used to mean farming plus all the other industries and services that constitute the supply chain from farm through processing, wholesaling and retailing to the consumer (from farm to fork in the case of food products).

Agro-industry comprises all the post-harvest activities that are involved in the transformation, preservation and preparation of agricultural production for intermediary or final consumption of food and non-food products (Wilkinson & Rocha 2009). It consists of six main groups according to the International Standard Industrial Classification (ISIC), namely food and beverages; tobacco products; paper and wood products; textiles, footwear and apparel; leather products; and rubber products. The term captures a diverse range of primary and secondary post-harvest activities, ranging from basic village-level commodity preparation to modern industrial processing and involving widely differing levels of scale, complexity and labour, capital and technology intensity. Food processing industries tend to dominate this sector in developing countries, including Africa. Rao (2006) groups food processing industries into three categories: *Primary*—those that involve the basic processing of natural produce, for example, cleaning, grading and dehusking; *secondary*—those that include simple or elementary modification of natural produce, for example, hydrogenation of edible oils; and *tertiary*—those that include some form of advanced modification to the natural produce such as making it into edible products like tomatoes into ketchup, dairy products into cheese etc.

The agrifood system encompasses the interlinked set of activities that run from “seed to table”, including agricultural input production and distribution, farm-level production, raw product assembly, processing and marketing. It encompasses the value chains for different agricultural and food products and inputs and the linkages among them. The agrifood system is also a shorthand term for agriculture and related agro-industries. While most of the analysis refers explicitly to that part of this “expanded agriculture” that produces food, many of the conclusions apply equally well to those parts of agriculture and agro-industry that produce non-food products such as fibers and biofuels.

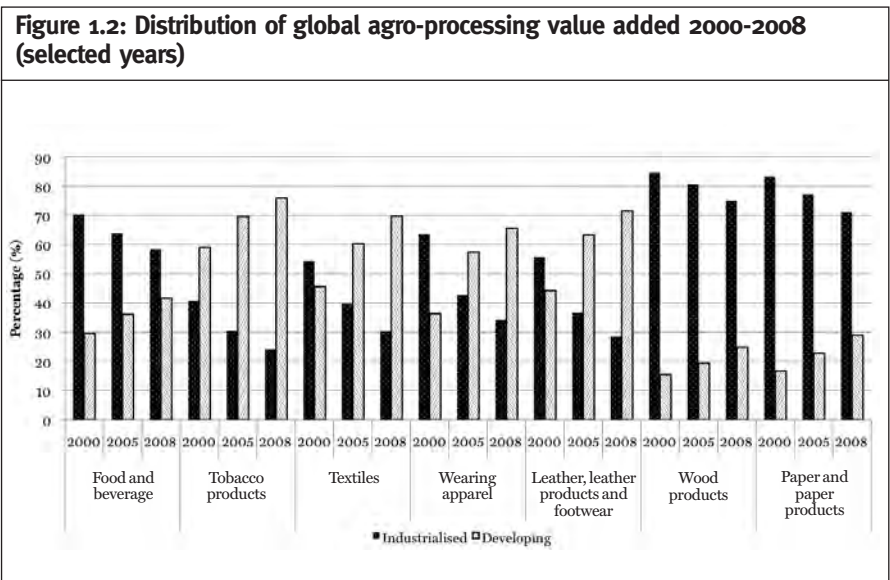
Agro-processing is the “subset of manufacturing that processes raw materials and intermediate products derived from the agricultural sector. Agro-processing industry thus means transforming products originating from agriculture, forestry and fisheries.” (FAO 1997).



Source: Authors' calculations, based on UNIDO (2009a)

accounted for fully 68 per cent of total MVA in the least developed countries (LDCs) (Figure 1.1) (ibid). According to the World Bank classification, agro-processing activity accounts for 68 per cent of total manufacturing in agriculture-based countries, 42 per cent in countries undergoing transformation and 37 per cent in urbanized developing countries (World Bank 2007a).

Although industrialized countries continue to account for the majority of global agro-processing value-addition, over the last decade there has been a marked shift away from industrialized countries to the developing world.



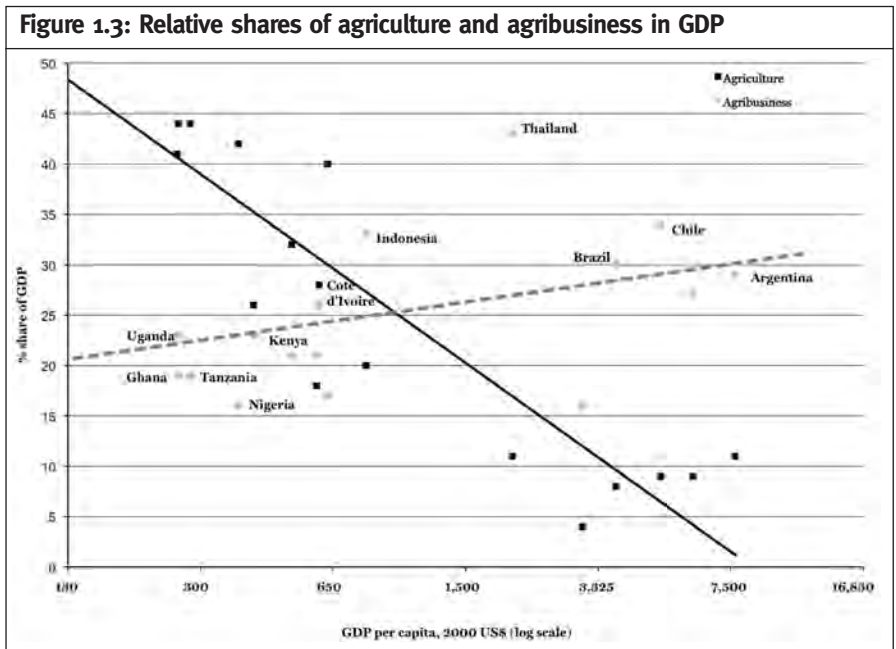
Source: Authors' calculations, based on UNIDO (2009a)

1. New global realities governing agribusiness

Figure 1.2 shows that developing countries now dominate tobacco products, textiles, wearing apparel and leather, and are rapidly approaching parity in the largest category by value, food and beverages (UNIDO & FAO 2009). Indeed, it is only in the categories of wood and paper products that OECD countries are clearly dominant.

This shift reflects both the general impact of rapid manufacturing growth in East Asia, South-East Asia and Oceania, and structural change in the relative position of agro-industry within the economies of both the industrialized and developing worlds. Past experience in industrialized countries suggests that the share of agribusiness typically rises from less than 20 per cent to more than 30 per cent of total GDP before declining as GDP *per capita* increases. Typically, over the same period, agriculture's share falls from around 40 per cent of GDP to under 10 per cent (Figure 1.3). Moreover, although spending *per capita* on processed foods is still relatively low in the developing world at \$143 *per capita* per year in lower-middle-income countries and \$63 in low-income countries, it is growing fastest in these countries—28 per cent annually in lower-middle-income countries and 13 per cent in low-income countries during the period 1996-2002 (Regmi & Gehlar 2005).

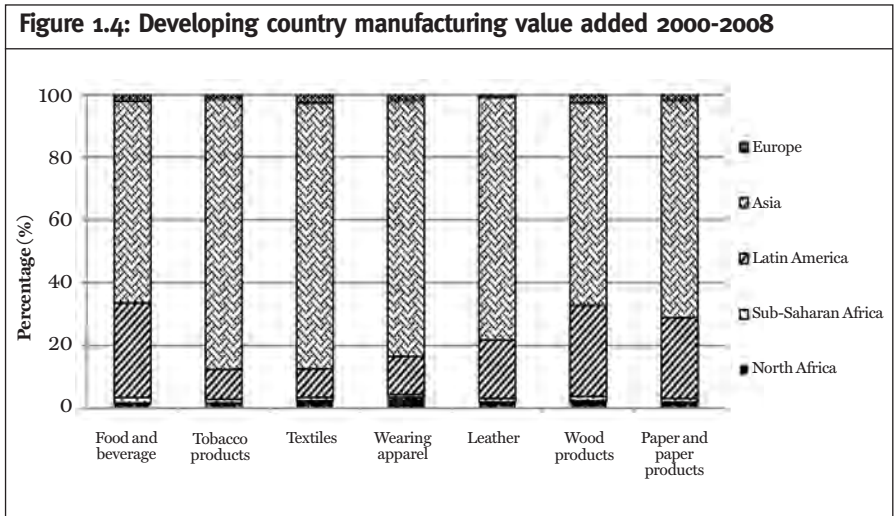
Most of the developing world's large and growing share of global agro-industrial value added is accounted for by developing Asia and Latin America, with Africa accounting for a small, and decreasing, fraction of agro-industrial value added.



Source: UNIDO, based on analysis of World Bank (2003)

Note: Agribusiness includes the value added for agro-related industries and for agricultural trade and distribution services. Data are for Argentina, Brazil, Cameroon, Chile, Côte d'Ivoire, Ghana, India, Indonesia, Kenya, Malaysia, Mexico, Nigeria, Republic of Korea, South Africa, United Republic of Tanzania, Thailand, Uganda, and Zimbabwe.

Figure 1.4 illustrates Asia's increasing dominance of developing country value added across all agro-industrial product categories. Together with Latin America, Asia accounts for some 90 per cent of total developing country value added.



Source: Authors' calculations, based on UNIDO (2009a)

Patterns of global agro-industrial trade

The shift in agro-industrial output from the industrialized to the developing world is mirrored in export patterns for agro-industrial goods, especially from Asia and Latin America. Since 1990, Asia—China in particular—has increased its market share dramatically at the expense of OECD economies. During this period emerging markets have expanded their exports of processed foods significantly faster than their OECD counterparts with several product categories experiencing double-digit growth rates (Table 1.2 and Figure 1.5).

Disparities between Africa, Asia and Latin America in agro-industrial output also extend to export performance, which is overwhelmingly dominated by Asian and Latin American countries. Table 1.3 lists the top ten processed food exporters between 1990 and 2006, who together accounted for 75.9 per cent of developing country exports in 2006. Leading developing country exporters are Brazil, China, Argentina, Thailand, Malaysia, Indonesia, Mexico, India, Chile and Viet Nam.

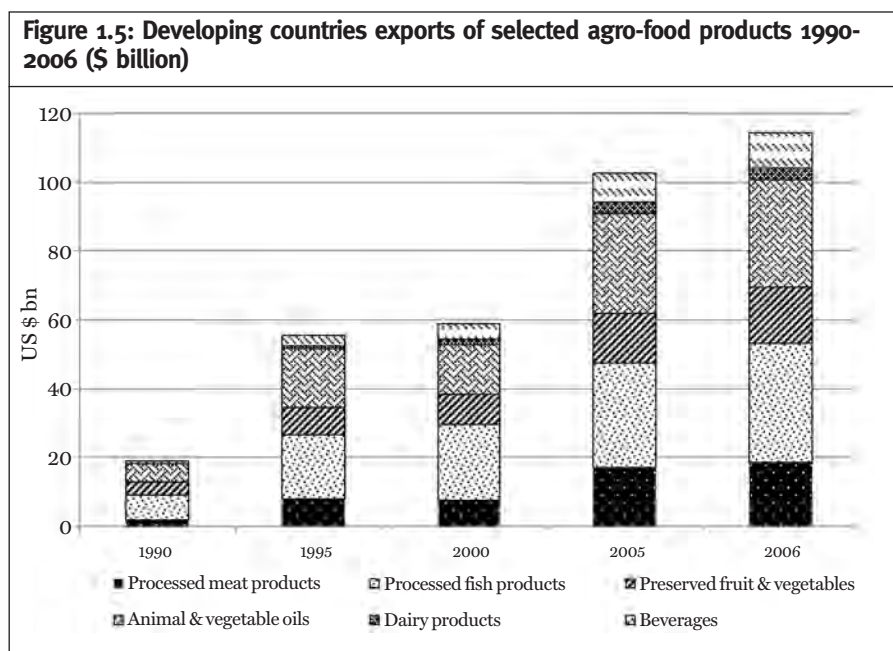
The experience of some of these countries—Brazil, Malaysia, Thailand and Chile—is analyzed in the case studies (section 1.2). A common feature emerging from the successful experience of these four countries is that agribusiness and agro-industrial development was the result of deliberate government policy and strategy towards diversification of their economies and the development of competitive industries. Apart from benefiting from substantial agricultural resources, great emphasis was placed on increasing productivity by applying science and technology as well as institutional support in an enabling private sector environment. Promot-

1. New global realities governing agribusiness

Table 1.2: Processed food exports for selected production categories 1990-2006

(\$ billion)		1990	1995	2000	2005	2006	Growth rate (%)
Processed and preserved meat	Industrialized	30.5	45.9	42.5	63.3	67.4	4.58
	Developing	2.0	7.8	7.7	17.2	18.5	13.26
	World	32.5	53.78	50.2	80.5	85.9	5.68
Processed and preserved fish	Industrialized	14.8	18.9	19.3	27.9	29.6	4.25
	Developing	7.0	18.6	22.1	30.4	34.8	9.29
	World	21.8	37.4	41.3	58.4	64.4	6.4
Processed and preserved fruit and vegetables	Industrialized	10.4	17.4	16.9	25.9	29.4	5.97
	Developing	3.8	8.0	8.5	14.4	16.3	8.58
	World	14.2	25.4	25.4	40.4	45.7	6.8
Vegetable and animal fats and oils	Industrialized	7.2	13.3	10.9	19.7	20.8	6.46
	Developing	5.4	17.0	14.5	28.9	30.9	10.07
	World	12.6	30.4	25.3	48.6	53.7	8.3

Source: UNIDO calculations based on UNIDO (2009a)



Source: UNIDO calculations based on UNIDO (2009a)

ing high product quality through standardization and certification bodies was also important, and there was increased awareness of the need to link agribusiness to the development of the rural non-farm sector, poverty reduction and environmental sustainability.

	Country	1990		Country	2006	
		Share of world proc. food exports %	Share of dev. country proc. food exports %		Share of world proc. food exports %	Share of dev. country proc. food exports %
1	Brazil	3.4	21.7	Brazil	4.5	15.3
2	Thailand	3.3	20.8	China	4.1	13.7
3	Malaysia	1.7	10.7	Argentina	2.7	9.1
4	China (Taiwan)	1.4	9.0	Thailand	2.6	8.9
5	Indonesia	0.9	6.0	Malaysia	1.9	6.3
6	India	0.9	5.9	Indonesia	1.7	5.9
7	Chile	0.7	4.4	Mexico	1.4	4.7
8	Mexico	0.7	4.2	India	1.4	4.7
9	Turkey	0.6	4.2	Chile	1.2	4.0
10	Ecuador	0.3	2.1	Vietnam	1.0	3.4
	Total	13.9	88.8		22.5	75.9

Source: UNIDO calculations, in Memedovic & Shepherd (2008)

1.2 Lessons from leading developing countries

Learning from others is an important guide for promoting industrialization and agribusiness development in Africa. In particular, new insight into key policy lessons from emerging economies is highly relevant to agribusiness development in Africa. The five largest emerging markets—China, India, Indonesia, Brazil and Russia—have recorded impressive growth rates while increasing market shares in world trade, export value added and trade-to-GDP ratios. As a group, these economies have become influential global agricultural market players, both as exporters and importers. With large populations, particularly in China and India, and fast-growing economies, they have provided, and will continue to provide, large markets for food and other agro-industrial commodities. What lessons can be drawn from the way these countries have used trade and openness as key drivers of growth and wealth creation? Although each country differs in the specifics of its economic situation, there are a number of commonalities in the policy measures applied and sequencing of policy reforms, especially in respect of trade and behind-the-border policies. Possible lessons for African governments include:

Policy reform: All five countries have opened up and restructured their economies along market-oriented lines and, in the process, improved their linkages to global trade networks (Henneberry 2009; OECD 2009a). Largely through unilateral liberalization at different periods over the past two decades, they have implemented tariff cuts and reduced non-tariff trade barriers. Foreign direct investment (FDI) was liberalized with fewer restrictions on entry, ownership, establishment and operations in the domestic economy. Trade and FDI liberalization was under-

taken within a framework of wide ranging macro and microeconomic market-based reforms. Trade liberalization in agriculture, however, has lagged behind that in the manufacturing and services sectors (Sally 2008). As a result, growth in exports of manufactured goods and services has been higher than growth in agricultural production and trade, particularly in China and India. OECD analyses of trade and growth patterns in emerging economies indicate that those countries and sectors that have opened up the most achieved the fastest growth rates.

Investment in agro-industrial research and extension services: The growing competitiveness of the agricultural sector in emerging economies is partly attributable to investments in agricultural research and extension. Similarly, China's investment in the development and large-scale adoption of improved seed varieties, fertilizer market liberalization and pricing policy reforms, helped boost agricultural productivity and served as a spring board for the growth of the agricultural sector, but also the manufacturing and services sectors (Ravallion 2009; Fan *et al.* 2010).

Market orientation in line with comparative advantages: Some of the emerging economies have successfully utilized market signals to exploit their inherent comparative advantage. China has been notable for its market-oriented approach to enterprise selection. This approach encouraged the expansion of labour-intensive enterprises (manufacturing of clothing, shoes and wooden products) that were in line with its relative factor endowments. By doing this, China avoided mistakes made in earlier decades by Brazil, India and Indonesia (and many African countries) in promoting capital-intensive enterprises in labour-abundant economies (Sally 2008). However, wages have remained low in China, inequality persists and social unrest has emerged in some industries, as well as environmental pollution from manufacturing and energy sectors.

Social inclusion and environmental sustainability: With growing FDI liberalization, social inclusion and environmental sustainability concerns come to the fore. But these concerns are being addressed in a variety of ways in order to guarantee social, political and environmental stability necessary for sustainable growth. In Brazil, increased FDI by large, private agribusinesses displaced domestic competitors, increased industry concentration and eliminated many SMEs. As a result, the market share of TNCs in the domestic food market increased, reaching 30 per cent in 2000 (Chaddad & Jank 2006). Many small farmers were also excluded. To redress this situation, the Brazilian government embarked on programmes of social inclusion and environmental sustainability. Examples of the former include the family farming programmes, which provide credit to low-income, small holder farmers, and food assistance programmes established under the 'Zero Hunger' (*Projeto Fome Zero*) initiative.

Trade negotiations and agreements: By locking into the multilateral trade system some emerging economy countries (Brazil, India and China) are increasingly using trade negotiations and agreements to promote growth. These are useful as they are reciprocal and broad-based and have provided a framework for multilateral trade rules for unilateral reforms (OECD 2009b). These lessons have important implications for articulating policies and strategies, as well as institutional mechanisms for the seven pillars of agribusiness development.

Box 1.2: Brazil: Application of science and technology as a dynamic source of competitiveness

Brazilian agribusiness has become a highly competitive sector worldwide and is the major driving force of the national economy, accounting for around one third of GDP, 38 per cent of the workforce and 42 per cent of exports. The country has a very strong natural resource base with vast areas of fertile land, of which 47 million hectares are used for agricultural purposes; and an estimated additional 100 million hectares that could be brought under cultivation without damaging the Amazon rainforest or adversely affecting the eco-system. The country is endowed with the world's largest and most bio-diverse rainforests as well as one of the largest renewable reserves of fresh water. It has a varied climate, which facilitates commercial agriculture including livestock farming. Investment in research played a vital role in transforming the Cerrado—a region of vast, once infertile tropical high plains stretching across Brazil—into highly productive cropland, thus unlocking Brazil's tremendous potential for food production. The advancements in soil science and policy leadership made agricultural development possible here, and the transformation improved economic and social conditions. The national agricultural research institute (EMBRAPA) played a leading role and has emerged as a world leader in agricultural research. Government and the private sector have established a large network of laboratories and research and development (R&D) institutes which has contributed to improved yields and productivity with new crop species and processes. The average annual growth rate of total factor productivity in Brazilian agriculture was estimated at 3.3 per cent for the period 1975-2002 and at 5.7 percent between 1988 and 2002. These rates are above the 1.8 per cent annual growth rate achieved by US agriculture between 1948 and 2002 (Gasques *et al.* 2004). This helped Brazil to meet domestic demand, while increasing and diversifying exports.

Brazil has since emerged as the leading world exporter of ethanol, sugar, meat, cattle beef, coffee, orange juice and the soy complex (including chaff, grain and oil). The country is the second leading exporter of soy grain and chicken and the fourth largest exporter of pork. In the last three decades it has transformed itself from a net cotton importer to the world's fifth largest exporter. Brazil is also the world's fifth biggest exporter of corn and rates amongst the top twenty exporters of rice. Other leading agro-exports include tobacco and fruit.

Brazilian agribusiness has built competitiveness in global markets by improving productivity by channeling investment into technology and innovation, expanding the use of fertilizers, introducing new plant varieties and acquiring first rate agricultural equipment. This was spearheaded by the private sector with the commitment of public resources, including rural credit and public investment in agricultural research.

Box 1.3: Malaysia: Continuous diversification towards new agribusiness activities⁸

The critical factor to Malaysia's agribusiness development was the productive reinvestment of the resources initially gained from this strategy of extensification of agriculture leading into systems that intensified agriculture. The government launched a diversification strategy in the 1960s to remove dependence on tin and rubber exports, including initiatives to develop non-resource-based

8. Adapted from Kjällerström (2007).

manufacturing. Export Processing Zones (EPZs) were established and fiscal incentives provided to attract FDI and encourage agricultural diversification by promoting the palm oil industry. Production and upgrading were encouraged by specialized public agencies, and the fiscal revenue obtained from taxes levied on the thriving export sector was reinvested into targeted R&D. Nowadays, palm oil accounts for over one-third of total value added in the agricultural sector (Ramasamy 2007). According to most recent data, Malaysia accounted for 4 per cent of world output (FAO 2010) and 46 per cent of world exports in 2008 (MPOB 2008).

In addition to the role played by land conversion, public intervention was critical in supporting market development, R&D and a conducive regulatory framework. The Palm Oil Registration and Licensing Authority (PORLA) undertook licensing and other regulatory activities to ensure that desired quality standards were met. The Palm Oil Research Institute of Malaysia (PORIM) conducted research aimed at improving productivity, value-addition and quality. PORLA and PORIM have since merged to form the Malaysian Palm Oil Board (MPOB). Since 1990, the Malaysian Palm Oil Promotion Council (MPOPC) has promoted palm oil overseas, through diverse marketing activities, launching joint ventures and providing technical support and information to increase consumer awareness of palm oil. Because the palm oil industry has been so successful, the agricultural sector is now deemed to have become too dependent on this one commodity and the Malaysian Government is seeking to further diversify the agricultural sector and reduce reliance on palm oil (Third National Agriculture Policy, 1998-2010).

Incentive packages are time-bound and target investment in “new” activities in line with Rodrik’s (2004a) recommendation that, in order to reduce the risk of perpetuating policy mistakes and to achieve spillover and demonstration effects, only “new” activities or products not previously produced locally, or new technologies applied to “old” products, should be given support. With the goal of making Malaysia a “competitive global producer of high quality and safe agricultural products that meet international standards”, the government emphasizes two broad policy objectives (a) the development of Malaysia as a hub for processing, packaging and marketing of agricultural products; and (b) the development of aquaculture, deep-sea fishing, ornamental fish breeding and halal produce subsectors (Ramasamy 2007).

Box 1.4: Thailand: Agro-industrial development for social inclusion

As a middle-income country Thailand has, since the 1960s, transformed its economy from largely rural and agrarian to urban industrializing. This has been facilitated by a growing role of manufacturing which increased from 23 per cent of output in 1980 to 35 per cent in 2006. During the same period, the corresponding share of agriculture declined from 20 per cent to 11 per cent. The country successfully increased agricultural output to feed a fast-growing population while exporting rice, cassava and some higher-value tropical products such as pineapples, rubber and shrimp. Indeed, so competitive are some Thai agricultural exports that they define the lowest cost of production worldwide.

Thai agriculture has grown at an average rate of just over 3 per cent annually since the early 1960s. Agriculture employs a disproportionate part of the labour force—almost 40 per cent in 2006—to generate a comparatively low share of GDP at 11 per cent. Poverty is thus largely rural in Thailand with more than 90 per cent

of the poor living in the countryside as of the mid-1990s. This concentration of poverty in rural areas is a function of the predominance of a large low-skilled workforce in agriculture and tends to be higher in the more isolated parts of the country, particularly the Northeast.

To some extent rural poverty has been mitigated by the rise of urban manufacturing and migration to the cities. But not all branches of manufacturing have been labour-intensive, and not all those who migrated found jobs. However, some success has been achieved in developing the rural non-farm economy to provide additional livelihoods in the countryside. The rural non-farm economy has now grown to the point where it provides around half of all rural jobs. Many of these are linked to flourishing agricultural firms. For example, in Poapongsakorn in central Thailand, a vibrant agro-processing sector, both upstream and downstream of farms, exists: growing paddy, sugar, and cassava surpluses led to the emergence of thousands of rice and sugar mills, cassava brokers, producers of cassava pellets, construction operations, metal workshops and agricultural equipment manufacturers, as well as that of livestock feed and village retail shops (Haggblade *et al.* 2007). In the less agriculturally prosperous Northeast region, different patterns emerged. Households also diversified, although not because of expanding opportunities but rather due to the inability of agriculture to keep pace with the growing population. In this resource-poor region, rural non-farm diversification centered on labour-intensive export activities such as gemstone cutting, silk weaving and production of artificial flowers for export.

Thailand has promoted the rural non-farm sector since the early 1970s through a range of measures. Measures undertaken in support of rural non-farm enterprise promotion include the establishment of one-stop services; networking of SMEs to raise their bargaining capacity; technology transfers, effected through conditions attached to foreign investment; technological support through national technology institutions; marketing support; provision of finance; and tax concessions (Development Analysis Network 2003); as well as microcredit and savings schemes. Among the more popular approaches to rural enterprise promotion is the development of "one village one product" (the Tambon). Small and medium-sized enterprise (SME) schemes, and the promotion of high potential business (e.g. tourism and agribusiness) were also used.

Conclusions

The present global setting provides opportunities for African countries to diversify their economies. In this context, agribusiness development represents a major pathway for sustainable economic development. The experiences of Brazil, Malaysia, and Thailand outlined above illustrates that policy choices are crucial for enhancing economic prosperity through agribusiness and agro-industrial development. African countries are well-positioned to learn from these lessons.

2. The profile of agribusiness in Africa

Torben M. Roepstorff, Steve Wiggins and
Anthony M. Hawkins

2.1. Agro-industry and agribusiness in contemporary Africa

At a continental level, the wider category of agribusiness, including both upstream (input) activities and downstream processing activities, as well as distribution and marketing, is estimated to account for approximately one fifth of GDP for sub-Saharan Africa and just under half of the region's value added in manufacturing and services (Jaffee *et al.* 2003, p.2). For individual African countries where data are available, the share of total manufacturing value added of the two primary agro-industrial subsectors (food and beverages, and tobacco) alone ranges from 17 per cent in South Africa to 47 per cent in Ethiopia (World Bank 2009a).

Although many of the economies of sub-Saharan Africa have undergone substantial structural change with the share of agriculture in GDP declining from 41 per cent in 1960 to 12 per cent in 2008, in most cases this has not been accompanied by the emergence of a dynamic and diversified manufacturing sector. The major part of the increase in industry's share in overall GDP (from 17 per cent in 1960 to 33 per cent in 2008) was accounted for by the extractive industries. Meanwhile the share of manufacturing increased only marginally from 8.7 per cent to 15 per cent over the same period, having stagnated or even declined since 1995. Also, the service sector expanded rapidly from 34 per cent in 1981 to 55 per cent in 2008 (Table 1.1).

Manufacturing, agro-industry and agribusiness

The size and structure of the manufacturing sector in Africa, and within manufacturing of the agro-industrial sector, obviously differs substantially between both subregions and individual countries⁹. Table 2.1 provides a breakdown of manufacturing as a percentage of GDP by sector at a continental and regional level over the five years to 2007¹⁰. At a regional level there is a clear division in the share of manufacturing value added (MVA) in GDP between Southern and North Africa (15.9 per cent and 12.7 per cent of GDP respectively) and Central, East and West Africa (9.2 per cent, 8.4 per cent and 7.5 per cent respectively), with the relative share of manufacturing in overall GDP static or declining across all regions in the past decade. These aggregate figures conceal high levels of differentiation within subregions, where manufacturing as a percentage of total GDP ranges from highs of 16-18 per cent (South Africa, Cote d'Ivoire, Cameroon) to lows of 3-5 per cent (Botswana, Gabon, Ethiopia) (World Bank 2009a).

	Simple average [weighted average] (per cent of total GDP)					
	2002	2003	2004	2005	2006	2007
Africa	10.8 [14.2]	10.7 [13.8]	10.6 [13.3]	10.3 [12.9]	10.4 [13.4]	10.7 [13.6]
East	8.7 [8.7]	8.5 [8.6]	8.6 [8.6]	8.3 [8.4]	8.0 [8.3]	8.4 [8.8]
West	8.5 [7.2]	8.5 [6.8]	8.67 [6.6]	8.7 [6.4]	7.9 [5.8]	7.5 [5.4]
Central	8.9 [12.5]	8.8 [12.3]	8.0 [11.3]	7.8 [10.5]	8.0 [10.6]	9.2 [11.7]
North	12.8 [15.4]	12.3 [14.6]	12.0 [14.2]	11.6 [13.7]	12.2 [15.7]	12.7 [15.8]
Southern	15.8 [17.7]	16.2 [17.5]	15.8 [17.1]	15.3 [16.6]	15.8 [16.4]	15.9 [16.3]

Source: United Nations Economic Commission for Africa (UNECA) calculations, based on World Bank (2008a) (UNECA & African Union 2009)

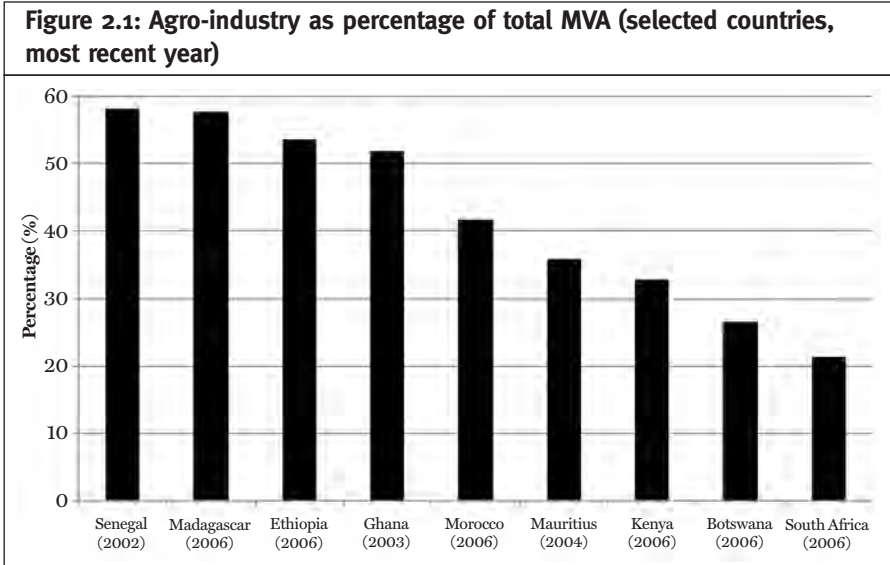
Within the manufacturing sector, agro-industry generally represents the single largest component, and in several countries accounts for more than half of total MVA (Figure 2.1). In structural terms, agro-industrial production in Africa follows an exaggerated version of the pattern of overall developing world production, with the categories of food, beverages and tobacco together accounting for the majority

9. It should be noted that regional definitions differ according to source. Where data on similar indicators is provided by two or more sources, reference is made to the information not being directly comparable. Data on regional economic communities (RECs) should be treated with caution due to overlapping memberships. Thus, data on South African Development Community (SADC) and Common Market for Eastern and Southern Africa (COMESA) is particularly problematic due to the inclusion of South Africa, the largest industrial power in Africa and a major exporter of farm products and agribusiness products, which distorts the picture in relation to smaller member countries such as Botswana, Malawi and Zambia.

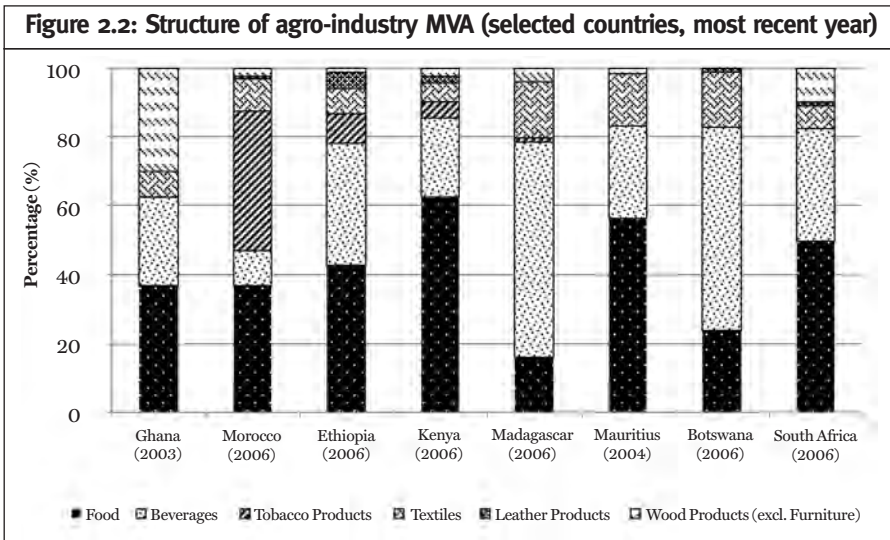
10. See also Annex 1.

2. The profile of agribusiness in Africa

of total output and manufacturing value added. Agro-industry as a per cent of total MVA for selected African countries is presented in Figure 2.2¹¹. Shares range from around 90 per cent in Kenya to around 60 per cent in Ghana, with textiles, leather and wood products together accounting for the remainder.



Source: World Bank (2009a)



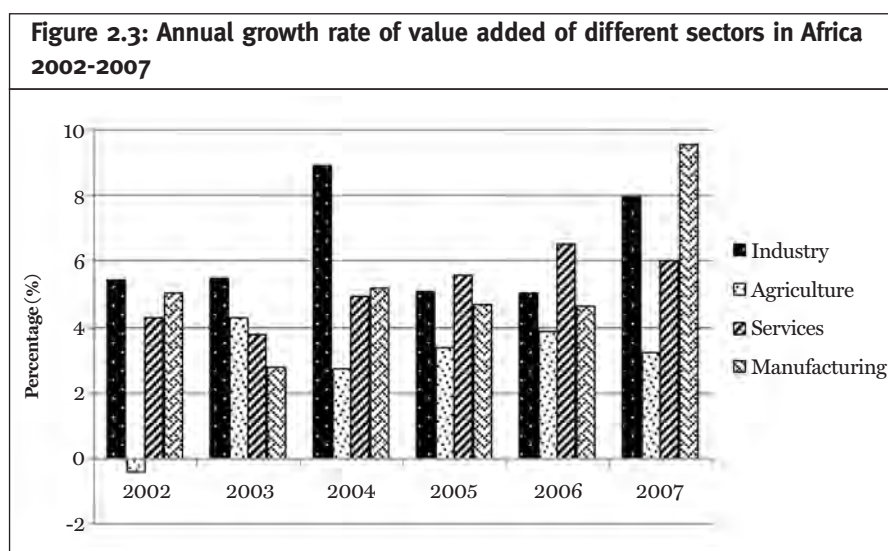
Source: UNIDO (2009a)

11. Individual country exceptions include Ghana, with wood products comprising 15.7 per cent of total MVA in the most recent period (2003), for which data is available (the other major categories are food (19.2 per cent) and beverages and tobacco (13.3 per cent amalgamated)); and Nigeria, with textiles comprising 19.5 per cent of total MVA in the most recent data series available (1996), as opposed to food (8.4 per cent) and beverages (9.7 per cent). No tobacco production was recorded.

In a significant number of African countries, the growth trajectory of agro-industry has mirrored that of manufacturing in general, witnessing substantial domestic and foreign investment and promising rates of growth in the 1960s and 1970s before entering a sustained period of relative stagnation from the 1980s onwards. The sources of this stagnation vary by country and subregion, but stem in large part from weak capabilities and/or inadequate institutions and fragile business environments.

Country	1999	2000	2001	2002	2003	2004	2005	2006
Botswana	22.7	20.4	20.4	19.3	20.4	20.4	22.6	22.0
Ethiopia	55.9	54.2	54.67	52.6	52.7	49.6	48.4	46.6
Ghana	..	..	..	..	32.5	..	..	..
Kenya	34.0	28.6	28.6	29.5	30.6	30.1	29.1	
Madagascar	..	..	35.9	41.5	41.6	41.5	40.1	..
Malawi	72.9	70.7	71.1	..	..	..	..	..
Mauritius	17.9	20.4	23.0	24.5	27.9	29.9	..	..
Morocco	..	34.4	..	..	..	31.6	36.3	36.6
Senegal	42.7	21.89	35.0	40.5	..	..	..	..
South Africa	16.1	15.5	15.4	15.3	16.0	16.6	16.7	..

Source: World Bank (2009a)



Source: UNIDO calculations, based on UNECA & African Union (2009) and World Bank (2009a)

This growth crisis, with both internal and external antecedents, was “manifested in rising fiscal deficits and mounting inflationary pressures, weakening domestic savings and investment rates, increasing external debt burdens, deteriorating terms of trade, sharply reduced financial inflows and generally poor sectoral performance” (Elhiraika 2008, p.3), contributing in several countries to the effective deindustrialization of nascent manufacturing sectors. The last decade has, however, witnessed an improvement both in overall macroeconomic performance across sub-Saharan Africa and rates of growth for the manufacturing sector, with value added growth rates averaging 5.3 per cent in the 5-year period 2002-2007 (Figure 2.3).

Agricultural input industries: fertilizers, mechanization and processing equipment

Agricultural inputs and industrial equipment for processing constitute important components of the agribusiness value chain. The use of these in African agriculture, however, is limited, with serious implications for the scope for increasing agricultural productivity and the supply of adequate output of raw materials for agro-industrial processing. This lack of productivity-enhancing inputs from the industrial sector and processing equipment represents a missing link of strategic importance to the agribusiness value chain and to the continent’s agricultural and industrial development.

Agricultural inputs – Fertilizers: In order to have a well-supplied agribusiness sector, it is important to develop the input industries along agricultural value chains. African agriculture exhibits extremely low levels of agro-chemical use relative to other developing regions, with the average for sub-Saharan Africa (12.5 kg/hectare (ha) of arable land) placing it substantially below both the global average of 102 kg/ha, and other developing regions such as Latin America and the Caribbean and South Asia (89.6 kg/ha and 106.7 kg/ha respectively) (World Bank 2007b). Within Africa, there exist wide disparities in levels of chemical fertilizer use by region with West African states demonstrating the lowest average levels (10kg/ha) of consumption, while countries in the Common Market for Eastern and Southern Africa (COMESA) apply an average of 62 kg/ha (World Bank 2004a).

Irrigation: There is a large untapped potential for expanding irrigation in Africa. Expansion of irrigated areas has been very limited compared with other developing regions, with only 4 million hectares added during the last 40 years. A new generation of better designed irrigation projects exists, where costs are comparable with those in other developing regions. Economic returns can be substantial if cultivated with higher-value crops. Industry has an important role to play in irrigation projects in terms of supplying irrigation pipes, equipment and construction.

Agricultural machinery: African agriculture remains substantially undercapitalized, with extremely low levels of mechanization contributing to agricultural productivity far below the level achieved in other parts of the developing world. Africa’s average of 13 tractors/100km² of arable land compares unfavourably both with the global average (200/100km²) and with the average for other developing regions such as South Asia (129/100km²) (World Bank 2007b). Again, there are substantial differences in levels of mechanization between countries and regions.

Agricultural mechanization is concentrated in those regions subject to high market demand, or where large-scale commercial farming predominates. North African countries have the highest concentration of agricultural mechanization with 108 tractors per 100 km² within the continent. In West Africa only 13 tractors are available for the same area (World Bank 2004a)

An assessment of the growth rate in tractor numbers between selected regions of the developing world suggests that sub-Saharan Africa has been almost uniquely unsuccessful in increasing its level of agricultural mechanization over time, with the growth rate in tractor numbers being lower than comparable developing regions by a factor of 15 or more (FAO 2008).

There is an urgent need to re-examine and take a fresh view of the role of agricultural mechanization in SSA. Analysis from across the country shows that there are strong correlations between economic growth and mechanization of agriculture (FAO 2008); countries that have achieved economic growth and solved their food problems have also advanced to higher levels of agricultural mechanization, while countries with stagnating economies and deeper poverty have lagged behind in agricultural mechanization. African agriculture would need to move away from centuries-old manual technologies towards more appropriate mechanized farm operations in highly selected areas and functions, leading to higher productivity, especially power-intensive operations such as land clearing and farming in medium and large-scale agriculture or joint farming operation among smaller farms or in farm cooperatives. The key policy challenge in labour surplus economies emanating from using more labour-saving techniques in highly specialized agricultural areas or functions is to ensure that while increasing productivity and enhancing competitiveness, development objectives related to employment generation and poverty reduction are not compromised (chapters 3 and 4).

There are some small, medium and large-scale enterprises producing agricultural machinery and equipment, as well as some service activities emerging in Africa, especially in South Africa, Egypt and Nigeria. Such industrial activities constitute a potential for development of a dynamic capital goods sector for agriculture in the medium and long term. Such industries could benefit from economies of scale and represent a potential for industrial expansion in Africa provided they can be developed on a viable basis to serve national, subregional, as well as the African regional market and further provided that the required capabilities can be developed (chapter 4). They further provide potential for diversification and job creation. There are also some informal rural livelihood industrial activities linked to agriculture, producing simple agricultural equipment and tools for example in the Sudan, Namibia and Angola, which could play an important role in the development of the rural non-farm sector (chapter 4).

Moreover, there is some scope for promoting the effective utilization and production of agro-processing machinery and equipment, as well as repair and maintenance facilities in Africa on a national, subregional or regional basis, based on economies of scale, where viable. Currently, Africa experiences long lead times for imported machinery, equipment and spare parts, which involve high maintenance costs.

2.2. Sources and structure of agro-industrial demand

Actual and potential demand for the products of African agro-industry is evolving rapidly, driven by a range of factors including rising *per capita* incomes, market and trade liberalization, changing technologies, population growth and increasing urbanization, with attendant changes in cultural norms and consumption patterns. In general, the proportion of income spent on food declines with increasing income ('Engels Law'). However, the ratio of food processing to agricultural value added rises with income, increasing from around 0.1 in Uganda and Nepal to around 0.4 in countries such as Brazil, Mexico and Argentina (World Bank 2007a). The overall market for agro-industrial products in Africa can be divided into four primary segments: (a) traditional food staples; (b) modern urban supply; (c) traditional export commodities; (d) non-traditional exports.

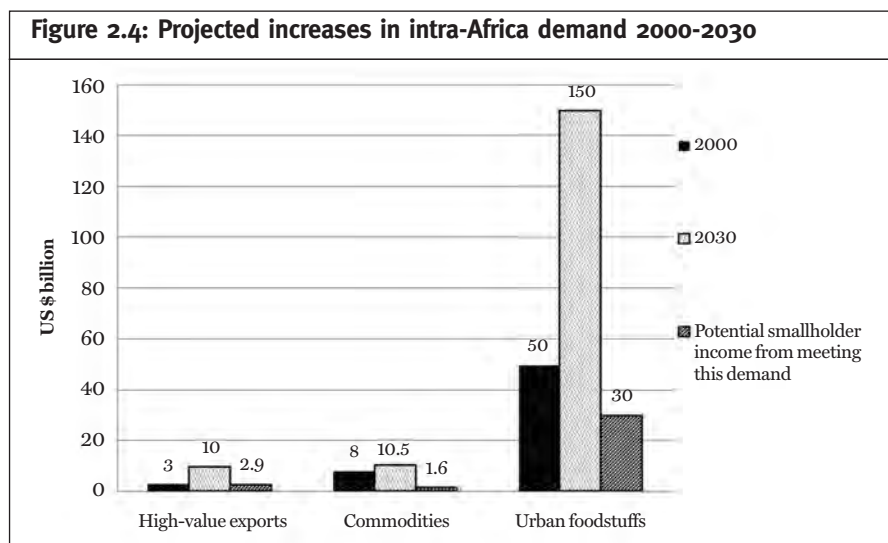
Both within Africa and globally, the main demand trend has been the shift away from the consumption of undifferentiated staple crops and towards increased consumption of fruit, vegetables, vegetable oils, fish, meat and dairy products as a percentage of total calorific intake. This has translated into a shift away from undifferentiated primary commodity products in international trade, towards higher value-added product categories. Although high value and non-traditional agro-industrial production for export provide dynamic and growing market opportunities for some African countries, the most important demand driver in Sub-Saharan Africa is, and will remain, the domestic and regional (intra-African) market. Diao *et al.* (2007) estimate domestic markets and intra-African trade to represent more than three quarters of total market value at a continental level, with domestic markets alone constituting 80 per cent of total market value in regions such as Eastern Africa (Table 2.3).

	Eastern Africa	Southern Africa	Western Africa	Total Africa
Traditional exports to non-Africa (%)	10	13	15	13
Non-traditional exports to non-Africa (%)	6	15	7	9
Other exports to non-Africa (%)	2	4	3	3
Intra-African trade (%)	2	6	1	3
Domestic markets for food staples (%)	80	63	74	73
Total market value (billions of US \$)	22	19.1	27.2	68.2

Source: Diao *et al.* (2007)

A study of projected increases in intra-African demand undertaken by the New Partnership for Africa's Development (NEPAD) Secretariat (2005) suggests that the opportunities provided by the growth of domestic and regional urban demand will massively outweigh those provided by high-value and commodity exports combined, amounting to an estimated \$150 billion by 2030 (NEPAD Secretariat 2005) Intra-African trade, however, has remained very limited at 10.6

per cent of the total between 1996 and 2006, primarily due to high intra-African tariffs and non-tariff barriers, weak transport links and obstacles related to the regulatory and operational framework for cross-border trade, logistics and cooperation (Table 2.4).



Source: NEPAD Secretariat (2005)

Table 2.4: Intra-African trade 1996-2006

	1996-2006 average		
	Share of intra-group trade (per cent of total)	Intra-group trade (growth rate, per cent)	Group total trade (growth rate, per cent)
<i>Africa</i>	10.6	11.2	12.9
CEMAC	6.8	6.6	16.1
COMESA	9.1	10.8	14.7
ECCAS	7.0	6.5	18.1
ECOWAS	11.8	14.4	12.9
SADC	8.7	7.4	9.3
WAEMU	8.8	8.3	6.1
AMU	8.1	10.1	15.78

Source: Data from UNCTAD secretariat, cited in UNCTAD (2009a)

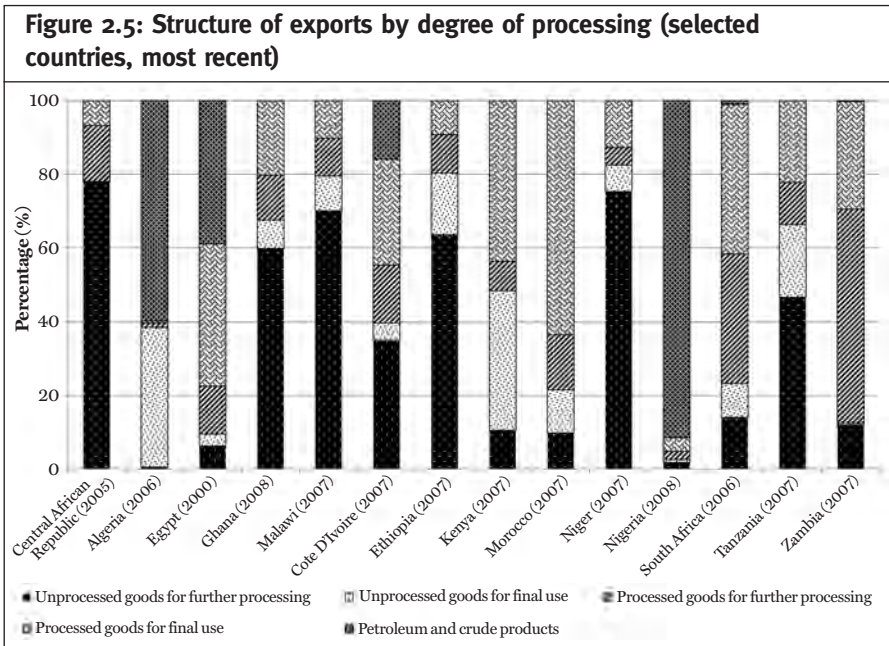
Note: CEMAC - Central African Economic and Monetary Community, COMESA - Common Market for Eastern and Southern Africa, ECCAS - Economic Community of Central African States, ECOWAS - Economic Community of West African States, SADC - South African Development Community, WAEMU - West African Economic and Monetary Union, AMU - Arab Maghreb Union.

Degree of processing of agricultural raw materials

Figure 2.5 below provides an overview of the export profile of a number of African countries, divided between four principal categories of processing and value addition (with the further inclusion of petroleum, crude and other partly refined products): (a) unprocessed goods for further processing; (b) unprocessed goods for final use; (c) processed goods for further processing; (d) processed goods for final use; and (e) petroleum, crude and other partly refined products. It demonstrates the widely varying picture between regions and individual countries.

Firstly, some countries such as Zambia, Morocco, South Africa, Kenya, Cote d'Ivoire, Egypt, United Republic of Tanzania and Ghana (ranked in descending order of degree of processing) succeeded in increasing the degree of processing with more than 30 per cent of total exports consisting of processed products for final use or for further processing. These countries have succeeded in diversifying their economies and in achieving higher value addition through processing agricultural raw materials and commodities, with processed goods exports even exceeding 75 per cent of the total exports profile in certain countries (Morocco and South Africa).

Secondly, other countries, especially least developed and landlocked countries, continue to depend on the export of primary or commodity products with more than 75 per cent consisting of unprocessed goods with very little or no processing involved. These countries include Ethiopia, Burundi, Central African Republic, Niger and Malawi. For these countries there is an urgent need to diversify their economies and break away from the clutches of raw material exports and resultant lack of employment and income generation, provided processing can be done in a competitive manner that adds value to products.



Source: Authors' calculations, based on UNIDO (2009a)

A third group of countries include oil producing countries such as Nigeria and Algeria, which continue to rely on exports of petroleum and related unprocessed products. For these countries the development of the non-oil export sector is particularly difficult due to 'Dutch disease' and problems of competitiveness connected with oil-driven exchange rates.

2.3. Africa: Why agribusiness?

As outlined in chapter 1, manufacturing has not played a dynamic role in the economic development of Africa to date. There are pressing issues that call for a reorientation to support agribusiness and agro-industrial development: namely, poverty reduction and the achievement of the MDGs; and ensuring equitable patterns of growth, that will address the concentration of employment and livelihoods in the agricultural sector. An agribusiness development path involving greater productivity growth throughout the entire agribusiness value chain—covering farms, firms and distributors—represents a solid foundation for rapid, inclusive economic growth and poverty reduction.

Agribusiness, economic growth and poverty reduction

Alongside its role in stimulating economic growth, agribusiness and agro-industrial development has the potential to contribute substantially to poverty reduction and improved social outcomes and "a consensus is emerging that agro-industries are a decisive component of socially-inclusive, competitive development strategies" (Wilkinson & Rocha 2008 p.1). Evidence of the link between growth and poverty reduction varies according to country. Spectacular economic and industrial growth in China lifted 475 million people out of poverty between 1990 and 2005, though large pockets of poverty still exist in growth-oriented areas and rural communities due to structural rigidities. In sub-Saharan Africa, despite strong growth in recent years, the number of people living on less than \$1.25 a day increased by 93 million during the same period (Montalvo & Ravallion 2010; World Bank 2009a). The achievement of the MDGs in sub-Saharan Africa has been constrained by two factors: firstly, most countries have not met the required GDP growth rate to reach the MDG1 target. Secondly, labour absorption and employment intensity have been low due to a concentration of growth in some capital-intensive extractive sectors. Agribusiness directly contributes to the achievement of three key MDG's (Box 2.1), namely reducing poverty and hunger (MDG1), empowering women (MDG3) and developing global partnerships for development (MDG8).

Strong synergies exist between agribusiness, agricultural performance and poverty reduction for Africa (World Bank 2007a); efficient agribusiness may stimulate agricultural growth and strong linkages between agribusiness and smallholders can reduce rural poverty. A focus on value addition in agribusiness is, therefore, central to existing strategies for economic diversification, structural transformation and technological upgrading of African economies. Such a focus can initiate faster progress towards prosperity, by affecting the bulk of the continent's economic activities and by harnessing critical linkages between the major economic sectors. This 'people-oriented' strategy will improve welfare and living standards of

the vast majority of Africans, both as producers and consumers, and from the perspective of employment¹², income and food security.

On the demand side, food expenditure often represents the largest single item of household expenditure, rising to more than half of total expenditure for poor households in some countries, and therefore “the efficiency of post-harvest operations is a major determinant of the prices paid by the urban and rural poor for food, and thus an important factor in household food security” (Jaffee *et al.* 2003, p.5). Agro-industrial development can contribute to improved health and food security for the poor by increasing the overall availability, variety and nutritional value of food products, and enabling food to be stored as a reserve against times of shortage, ensuring that sufficient food is available and that essential nutrients are consumed throughout the year.

On the supply side, agro-industrial development has a direct impact on the livelihoods of the poor both through increased employment in agro-industrial activities, and through increased demand for primary agricultural produce. Though varying significantly by subsector and region, agro-industry, particularly in its initial stages of development, is relatively labour-intensive, providing a range of opportunities for self and wage employment¹³.

Agro-industrial activity in Africa is also frequently distinguished by a high percentage of female employment, ranging from 50 per cent to as high as 90 per cent¹⁴ (Wilkinson & Rocha 2008 p.2). For example, the ‘non-traditional export sector’ (vegetables, fruit and fish products), which is currently the most dynamic in terms of exports from sub-Saharan Africa. Similarly, the small-scale food processing and catering operations ubiquitous throughout much of the continent are typically operated predominantly by women; a study of small-scale urban agro-processing and catering enterprises in Cameroon found that more than 80 per cent were managed by women, with men being present almost exclusively in the mechanical milling/grinding and meat preparation activities (Ferré *et al.* 1999). Indeed, Charmes notes that the gender bias apparent in many agro-processing activities may contribute to the general underestimation of both agro-industrial activity and female employment in national accounting, noting that “a very high share of these activities are undertaken as secondary activities and are generally hidden behind subsistence agriculture” (Charmes 2000).

12. It may be challenging to lift people out of poverty through direct employment generation in manufacturing alone, even with high employment elasticities and productivity growth, until the low initial manufacturing base increases in importance. The indirect impact of manufacturing growth on employment, however, is presumed to be quite significant, especially in the context of backward and forward linkages to agriculture and services through agribusiness development. In SSA such linkages are presumed to have great potential, despite being currently rather weak due to a limited proportion of agricultural raw materials being processed and exported and because critical industry-related services may not yet have developed.

13. In the case of Thailand, for example, Watanabe *et al.* (2009) suggest that for the period 1988-2000 not only was the number of employees per value added (1,000 baht) for agro-processing at or above the mean for manufacturing overall, the number of poor employees per value added in the agro-processing industry was substantially greater. The figures for food products (and the smaller wood and wood products sector) were more than double those of the average of the manufacturing industry, “implying that the agro-processing industry, particularly the food industry, tends to hire a greater number of the poor than other manufacturing industries” (*ibid.*, 450).

14. These figures exclude metals and energy. It should be noted that, within some market sectors at least, “strong gender segmentation in production and processing tends to consign women to more vulnerable forms of work (casual, temporary and seasonal), lower paid and more labour-intensive preparation and/or processing” (UNIDO *et al.* 2008)

Alongside job creation, agro-industrial enterprises often provide “crucial inputs and services to the farm sector for those with no access to such inputs”, inducing productivity and product quality improvements and “stimulating market induced innovation through chains and networks”, facilitating linkages and allowing domestic and export markets to become “more mutually supportive” (FAO 2007a, p.3). Agro-industry is also amongst the most accessible of industrial activities—frequently undertaken at small-scale, with low initial cost and technological barriers to entry. SMEs remain key actors in the largely informal trading and processing networks, which dominate food procurement in much of (newly) urban Africa, and have proved remarkably adaptive and resilient in the face of a range of economic, institutional and infrastructural challenges (Muchnik 2003; Sautier *et al.* 2006).

Box 2.1: Contribution of agribusiness to MDGs

The promotion of agribusiness development can constitute a dynamic element in reducing poverty, ensuring food security, mobilizing female labour participation and facilitating global partnerships for development both directly and indirectly:

MDG1 Reducing poverty and hunger:

- Generating economic growth, increasing and diversifying incomes and wealth creation, and creating employment and entrepreneurial opportunities in rural and urban areas.
- Stimulating productivity gains by smallholder farmers and improve their integration into local, regional and international markets and value chains.
- Improving food security by lowering the costs of food, reducing supply uncertainties, increasing storage life of food products through packaging and storage facilities and improving the diet of the rural and urban poor.

MDG3 Empowering women:

- Mobilizing female labour participation in a wide range of agribusiness activities.

MDG8 Developing global partnerships for development:

- Fostering global partnerships for access to technology, especially information and communications technology (ICT), for least developed and landlocked countries.

Box 2.2: Two stylized facts: Economic growth and poverty reduction

The statements that, as countries develop, so the share of agriculture in GDP and of agricultural jobs in total employment both decline, are stylized facts in standard debates on the topic. Although data sources do not correspond exactly, both World Bank (Table 1.1) and the United Nations Department of Economic and Social Affairs (UN-DESA) estimate the share of agriculture at between 12 and 18 per cent of GDP in sub-Saharan Africa for the period 1990-2006. International Labour Organization (ILO) figures also show that the share of agriculture in total employment in this region is 65 per cent (Table 2.5), illustrating the ‘large and persistent gap’ between the share of agriculture in GDP and the share of agriculture in the labour force (World Bank 2007a, p.7).

There are two obvious explanations for this gap: firstly, the employment numbers are no more than speculative because unknown numbers of underemployed, informal sector employees are classified as ‘employed’ in agriculture. Secondly, the gap underlines the very low levels of productivity in the farming sector.

There is therefore considerable scope for boosting agricultural production both by finding full-time employment for those currently underemployed, and by increasing productivity. According to the World Bank, GDP growth generated in agriculture is at least twice as effective in reducing poverty as growth generated by other sectors, but as countries become more prosperous so the effectiveness of agricultural growth in poverty reduction weakens (World Bank 2007a).

The World Bank further estimates that 81 per cent of the worldwide reduction in rural poverty (1993-2002) was attributable to improved conditions in rural areas and only 19 per cent to rural-to-urban migration. However this analysis is unsatisfactory on a number of counts, of which two stand out.

The distinction between employment and output in agriculture and in agribusiness-related activities is arbitrary. With the growth and sophistication of value chains, clusters and agglomeration economies, the reliability of econometric studies that attribute growth to one sector rather than another is increasingly problematic. Thus, in their study of poverty reduction in China, Montalvo & Ravallion (2010) conclude as follows: “We do not doubt that the non-primary sectors were at least the proximate drivers of aggregate growth, but it was the primary sector that did the heavy lifting against poverty”. It is for this reason that the focus in this book is on agribusiness—the entire value chain—rather than seeking to disaggregate the value chain between proximate and non-proximate drivers on an arbitrary basis.

A second problem arises from the assertion that only 19 per cent of the worldwide reduction in rural poverty was attributable to rural-urban migration. This does not square with the evidence on the ground that in 2006—for the first time in world history—more people in the global economy lived in urban than non-urban areas (McCann 2008). This raises doubts as to whether growth in non-farm rural jobs made a major contribution to poverty reduction, as would have to be the case to be consistent with the sharp decline in agriculture’s share in total employment.

Turning to the Chinese ‘miracle’ of poverty reduction, the empirical evidence suggests an alternative interpretation: rather than analysing the pattern of poverty reduction by sector, it is more meaningful to analyse patterns on a regional basis. Indeed, poverty reduction since the mid-1980s in China has been most dramatic in the eastern regions, followed by the central regions, with poverty increasing in the western regions (Angang et al. 2005).

Moreover this is not just an urban phenomenon because the ratio of *per capita* farming incomes in the east and central regions relative to the western region increased. On the basis of these data McCann (2008) concludes: “...the competition and wealth effects associated with buoyant regional growth across a range of local sectors tend to spill over to other local sectors, and agriculture in such buoyant regions also benefits from this.”

Especially in the increasingly clustered economic structures that are consistent with urbanization spillover effects, inter-firm and inter-sector linkages are critical, and it is very difficult to sustain the argument that mega-cities grow rapidly because agricultural production in surrounding areas creates the impetus for such expansion. Efforts to identify precisely which sectors and activities account for growth and poverty reduction are unlikely to be meaningful.

Consequently it is the second stylized fact—the declining share of agriculture and rural activities in total employment—that reveals more about structural change than do sectoral shares in GDP. It is for this reason that the focus of this report is agribusiness, which incorporates the linkages and spillovers between three traditionally narrowly-defined sectors—agriculture, agro-industry and agro-services.

Table 2.5: Sectoral shares in employment, world and regions, 1997 and 2005 to 2007			
	Employment in sector as share of total employment		Female employment as share of sector total
	1997	2007*	2007*
Agriculture			
World	41.4	34.9	41.3
North Africa	35.4	32.8	23.9
<i>Sub-Saharan Africa</i>	<i>72.1</i>	<i>64.7</i>	<i>44.4</i>
Industry			
World	21.1	22.4	31.2
North Africa	19.9	20.6	17.7
<i>Sub-Saharan Africa</i>	<i>8.5</i>	<i>9.6</i>	<i>25.5</i>
Services			
World	37.5	42.7	43.2
North Africa	44.7	46.6	26.9
<i>Sub-Saharan Africa</i>	<i>19.4</i>	<i>25.7</i>	<i>43.4</i>

Source: ILO, Global Employment Trends Model, November 2007, cited in ILO (2008)

*Preliminary estimates

2.4. Promoting agribusiness development in Africa

Agribusiness and agro-industry have the potential to contribute to a range of economic and social development processes, including increased employment generation (particularly female employment), income generation, poverty reduction and improvements in nutrition, health and overall food security. Nevertheless, there remain substantial barriers to fully developing the agribusiness potential evident across the continent. Many of the enabling conditions required for sustainable agribusiness development are not specific to the sector (or to manufacturing in general), but apply to all sectors of the economy. These include a stable macroeconomic climate, good public governance including functioning regulatory institutions, enforceable commercial laws and property rights, and adequate infrastructure and basic services, including transport, ICTs and utilities. Historically, they have also included the existence of a relatively high-capacity, interventionist state with active resource allocation and demand management strategies.

A range of policies, institutions and services are more directly relevant to the agribusiness sector. These include *inter alia*: building the necessary industrial capabilities and capacities; upgrading technology and innovation in terms of product and processes; strengthening managerial capacities in the field of production effi-

ciency and business linkages, and cross-border cooperation; building capacity to trade in agro-industrial products; participating in global, regional and local value chains; improving rural infrastructure and energy security; promulgating standardization and quality control measures, and establishing associated accreditation bodies; promoting institutional services for agribusiness; and mobilizing public-private sector cooperation on agribusiness development. Increasing the scale and competitiveness of Africa's agribusiness sector is critical—for farmers, agro-industrial enterprises and industry-related services. Indeed, the key challenge for developing agribusiness in Africa is the upgrading and improvement of manufacturing capacities and capabilities to overcome constraints related to the development of efficient industrial enterprises capable of competing in international, regional and domestic markets.

Driven by globalization and economies of scale, the international market for agribusiness products is often characterized as oligopoly with a few powerful actors—mainly large multinationals (Box 2.3) and retailers—seeking the most cost-efficient suppliers worldwide, and where cut-throat competition is prevalent. This has led to a growing concentration, with food processing firms integrating backward towards agriculture and forward towards the retail sector, bypassing traditional markets where smallholders sell to local markets and traders. The international market is highly competitive in terms of price and product quality, requiring ICT connectivity and often 'just-in-time' delivery, with resultant high requirements in terms of logistical efficiency. Exacting requirements are placed on suppliers to meet conformity standards and specifications, demanded by consumers in developed countries and increasingly by the growing middle class in emerging economies. This makes it difficult, though not impossible, for African agro-industries to 'break in and move up' the global value chain (UNIDO 2009b). In contrast, the national, subregional and regional market in Africa has many competitive advantages for African producers in terms of proximity of markets and similarity of consumer preferences. Modern supermarkets and retail outlets are rapidly expanding in many African countries. A key challenge is the involvement of small farmers in the agro-industry supply chain.

Box 2.3: Global players in agribusiness value chain

Major global players in agribusiness are large multinational corporations operating through a network of subsidiaries and cooperating partners worldwide in various parts of the value chain, such as Cargill, Louis Dreyfus Commodities, ADM, Bunge, Wilmer and Olam. They are massive buyers and suppliers of agricultural commodities, employing hundreds of thousands of staff internationally. These companies tend to run their operations by maintaining close contact with farmers, expanding down the supply chain from large-volume, thin-profit business of trading bulk agricultural commodities, to transform some raw materials into premium products to sell at a premium. While usually concentrated in certain commodities, the largest have diversified operations into areas such as fertilizers, as well as transport and storage, and financial functions (e.g. hedging against associated risks).

Source: Adapted from Blas & Meyer (2010)

In attempting to address these binding constraints and opportunities, UNIDO has identified seven cross-cutting development pillars, representing the key drivers for transforming challenges for agribusiness development into opportunities. These pillars are based on the identification of binding constraints and corresponding paths of action by African policymakers and researchers in various Africa fora such as: (a) The High-level Conference on the development of agribusiness and agro-industries in Africa, held in Abuja in March 2010, endorsing the *African Agribusiness and Agro-Industries Development Initiative (3ADI)* and the resultant *Abuja Declaration on Development of Agribusiness and Agro-Industries in Africa*; and (b) The African Union Summit of Heads of State and Government, held in Addis Ababa in 2008, which considered the theme of The Industrial Development of Africa and endorsed the *Declaration on Accelerating Africa's Development through Industrialization*.

The seven development pillars identified are as follows:

Pillar 1 Enhancing agricultural productivity

The Comprehensive African Agricultural Development Programme (CAADP) has established very ambitious targets for Africa's annual agricultural growth. The sources of this growth are analysed in chapter 3 in terms of increasing factor use and productivity, as well as the key drivers of dynamic agricultural growth in Africa. The chapter provides an empirical analysis of supply-side and demand-side issues related to the agricultural sector in terms of structural transformation, agro-industrial commodity linkages, and important policy interactions. The role of the agricultural inputs that are required by agro-industry for achieving higher productivity, competitiveness, growth, and consumer quality are discussed. The efficiency gains of focusing more on regional markets in Africa, of considering the impact of the choice of techniques, of innovative business models, and of new agro-industrial policies are also addressed.

Pillar 2 Upgrading value chains

Chapter 4 addresses market development for commodities and processed goods via value chains, and potential ways of strengthening the competitiveness of firms and farms within those value chains based on *inter alia* ten case studies. The conceptual basis for linking African producers to local, regional and global value chains is presented, and options for product, process and functional upgrading are considered with the aim of improving the competitiveness of firms and farms in value chains. The role of standards and of quality management with regard to the products supplied by the value chain to markets, and the issue of coordination and governance in the value chain, so as to reach a higher level of efficiency in the system, is presented.

Pillar 3 Exploiting local, regional and international demand

Chapter 5 provides insights into the local, regional and global market demand dynamics affecting African agribusiness. Increasing supply to these markets, especially intra-African markets, will require agribusinesses to improve quality, to inno-

vate, and to be able to adapt quickly to changing demand patterns and market opportunities for processed and higher-value agro-industrial products. New marketing instruments and market research activities via value chains and clusters are considered. At the national and continental levels, policies to reduce supply-side rigidities are reviewed. At the international level, trade reforms towards removing trade distortions that unfavourably affect agro-industrial exports are analysed, and the potential for these policies to increase competitiveness is highlighted. The role of related trade institutions is reviewed, as well as efforts to build trade capacity through aid for trade for agro-industrial products, both regionally and globally. Main emphasis is given to the importance of intra-African markets.

Pillar 4 Strengthening technological efforts and innovation capabilities

The critical role of science, technology and innovation (STI) in promoting agro-industrial development is analysed in chapter 6 along with trends in STI expenditures and inputs, and strategies and policies necessary for agribusiness development. An analysis of the role of STI in creating comparative advantages in Africa's agro-industry subsectors is provided, and new trends and forms of technical learning in firms, value chains and clusters are assessed. The state of national innovation systems (NISs) is also assessed, and the policy relevance of this tool for new agro-industrial development policies is highlighted.

Pillar 5 Promoting effective and innovative sources of financing

Chapter 7 addresses public and private financing mechanisms for agribusiness development in Africa, including traditional domestic and foreign sources of investment, and innovative new financing mechanisms for promoting investments in agro-industry and agribusiness. An outline of the financing needs of agro-industry firms, value chains, and clusters is presented, and case studies outline innovative financing methods. An assessment of those banks and finance institutions (including microfinance banks and associations) that are traditionally involved in the financing of agriculture, agribusiness and agro-industry is also provided, alongside recommendations for reform.

Pillar 6 Stimulating private sector participation

The scope for strengthening private enterprise development in agro-industry, focusing on the creation of an enabling policy environment for agribusiness investors is examined in chapter 8. The provision of appropriate factor conditions in input and output markets and of institutional support services for agribusinesses is highlighted. The role of domestic and foreign investment in agribusiness is considered, as are related reforms of macro-policies and of institutions. The importance of private-sector producer organizations, associations, alliances, cooperatives, and of chambers of commerce and industry is emphasized, as these are indispensable for organizing government support in the form of public goods, for developing and improving technical and business support systems, and for enhancing investment promotion policies and institutions. New investment strategies and policies for agribusiness development are discussed across a range of areas including trade,

taxation and public expenditure, public investment, provision of public goods in general, and regional and structural policies.

Pillar 7 Improving infrastructure and energy access

The infrastructure bottlenecks affecting agro-industry, including transport capacity, access to energy and ICT systems, rural roads, irrigation facilities, warehouse facilities, and storage facilities are assessed in chapter 9. Technical support systems (for quality control and metrology) and the business support systems (for consulting and marketing services) are also discussed. Infrastructural bottlenecks create high costs and impede innovation and expansion of firms, value chains and clusters. High transport and communication costs, and other costs related to distance and unreliability of services, create disadvantages to producers and impede the realization of comparative advantages. New methods and instruments to overcome these bottlenecks in agro-industrial production are discussed in this chapter. Innovative methods for increasing energy production are also discussed, including using outputs and waste for sustainable heating and power generation.

Part B: The seven core pillars of agribusiness development in Africa

3. Enhancing agricultural productivity

John Staatz

3.1. Introduction

The pace of change in agribusiness, agro-food and agro-industrial markets around the world is accelerating rapidly. If Africa is to benefit from these changes, African agro-industry needs to undergo a structural transformation. In fact, in terms of the transformation of the economy structural change in farming and agro-industry are tightly interrelated and cannot be analysed independently of one another. Transformations of the entire agribusiness sector involve increasing the productivity of activities at each stage of the different agriculture-based value chains, while simultaneously improving coordination among those stages. Improved vertical coordination is critical to achieve the timely flow of productivity-enhancing inputs to farmers and of quality agricultural raw materials to agro-industry. At the same time, production must be closely aligned with the rapidly evolving demands of consumers.

This chapter examines the supply-side challenges of agribusiness development in Africa, identifying the sources of growth through value addition, as well as the prime movers for transforming the agro-food system¹⁵. It concludes by outlining three key strategies African governments and their development partners should pursue to overcome the constraints of agribusiness development.

15. The term “agro-food system” is used here as shorthand for agriculture and related agro-industries. It encompasses the interlinked set of activities that run from ‘seed to table’, including agricultural input production and distribution, farm-level production, raw product assembly, processing and marketing. It thus encompasses the value chains for different agricultural and food products and inputs and the linkages among them. While it pertains explicitly to food, many of the conclusions apply equally well to those parts of agriculture and agro-industry that produce non-food products such as fibers and biofuels (see Box 1.1).

3.2. The challenge: spurring productivity growth in agro-food systems

Since 2000, there has been growing political and academic consensus that an agriculture-led approach to development, involving stronger productivity growth throughout the entire agro-food system, offers the best opportunity for rapid, widely-shared economic growth and poverty reduction in sub-Saharan Africa (Partnership to Cut Hunger and Poverty in Africa 2002; InterAcademy Council 2004; World Bank 2007a; UNECA & African Union 2007; Staatz & Dembélé 2008).

Farming, small-scale agro-processing and retailing are especially important sources of women's incomes (World Bank *et al.* 2009). A large body of empirical evidence suggests that agricultural growth is the key determinant of overall economic growth and poverty reduction in most sub-Saharan African countries (Christiaensen & Demery 2007; Byerlee *et al.* 2005; DFID 2005; Dercon 2009; Diao *et al.* 2003; Mwabu & Thorbecke 2004; Wolgin 2001). The growing political consensus regarding the importance of agriculture reflects the renewed commitment of African governments and their development partners to supporting agrifood system development via initiatives such as the Comprehensive Africa Agriculture Development Programme (CAADP), launched in 2003 and endorsed by African Heads of State and Government and by most major development partners. CAADP sets ambitious goals for agricultural investment and growth. Member states of the African Union (AU) have pledged to invest a minimum of 10 per cent of budgetary resources to the agricultural sector, and the G-8, meeting in L'Aquila, Italy in 2009 renewed donor commitments to CAADP (African Union & NEPAD 2004; G-8 2009).

Low productivity in African farming

In 2004, CAADP set a target for an average annual rate of agricultural growth of 6 per cent – the rate that was judged necessary at the time if sub-Saharan African countries were to meet the MDG1 of halving the poverty rate by 2015. Today, it is recognized that the vast majority of countries will not reach the MDG poverty reduction goal by 2015 (World Bank 2010a), but the 6 per cent agricultural growth rate remains a target.

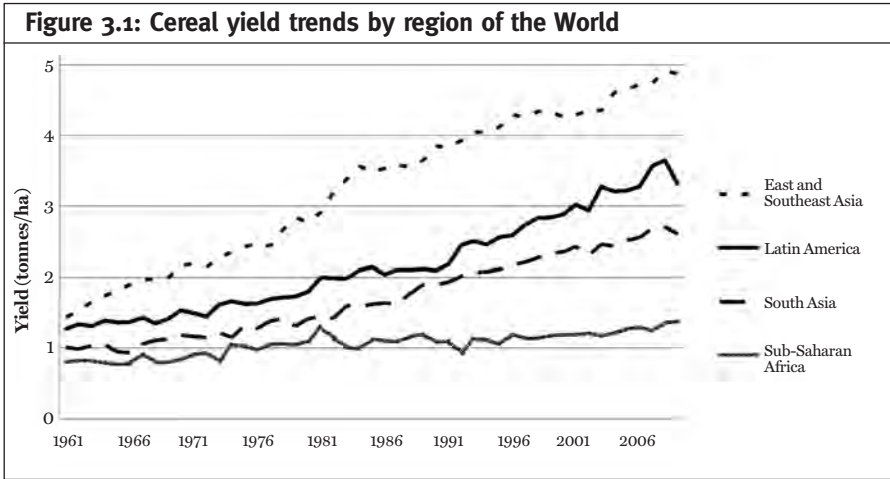
Reaching this 6 per cent annual growth rate poses an enormous challenge. For sub-Saharan African countries to attain and sustain this target growth rate will require increased productivity, not just in farming but throughout the entire agro-food system. Out of 45 countries for which data are available, only one, Angola, during its post-war recovery phase, achieved an annual growth rate in agriculture value added between 2000 and 2008 of at least 6 per cent (World Bank 2010b)¹⁶.

According to FAO estimates for sub-Saharan Africa, agricultural production has grown more slowly than population over the past 45 years, with a resulting decline in *per capita* food availability from domestic sources. (UNIDO *et al.* 2008) show that increased agricultural production has been a function of more extensive land use—the expansion of the land area under crops or supporting livestock—arising from the relative abundance of arable land and relatively low rents. Yields

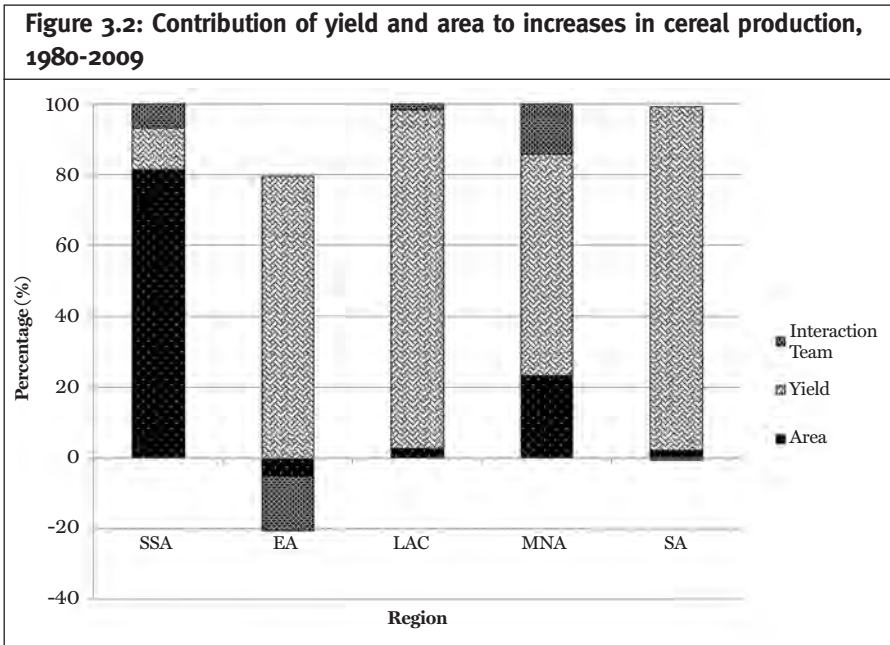
16. This was a period when Angola's agriculture was recovering from the huge disruption previously caused by the 27-year civil war, which officially ended in 2002; thus, a rapid percentage growth rate during the immediate post-crisis period is not surprising. During the 2000-2008 period, an additional four SSA countries (Ethiopia, Guinea-Bissau, Mozambique and Nigeria) had sustained growth rates of 6 per cent or higher for at least four years in a row.

3. Enhancing agricultural productivity

per hectare have been essentially stagnant, especially for cereals, in contrast with substantial yield increases in other regions (Figure 3.1 to Figure 3.3). Cereal yields increased only 29 per cent in the 43 years between 1961-63 and 2003-05, compared to 177 per cent in developing Asia and 144 per cent in Latin America. The increased farm production in countries that successfully exploited green revolution technologies was achieved by technological progress so that total factor productivity

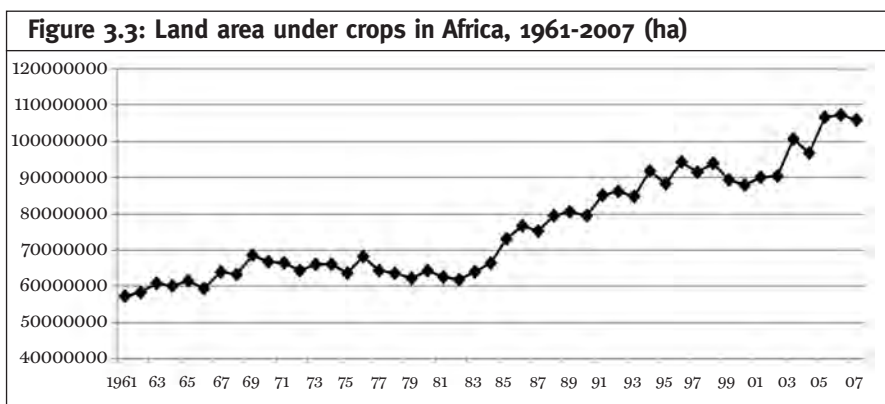


Source: Authors calculations based on data from FAO (2010a)



Source: FAOSTAT, as reported in AfDB *et al.* (2007)

Note: FAOSTAT is the department of the Food and Agriculture Organization of the United Nations (FAO), which provides time-series and cross sectional data relating to food and agriculture for some 200 countries.



Source: FAO (2010a)

Table 3.1: African agricultural growth decomposition, 1971-2000

Growth source	1971 – 2000 (per cent)
Total growth	100
Factor inputs	98.4
Land	4.1
Labour	21.0
Tractors	25.4
Fertilizers	51.3
Livestock	-3.5
Unaccounted factors (climate, politics)	-65.4
TFP change	66.9

Source: Nkamleu (2007)

(TFP) was the key source of output growth, whereas in Africa the use of factor inputs has been more important (Table 3.1).

Whether Africa can continue to increase agricultural production primarily through expansion of land under cultivation is not as straightforward as often suggested. While many reports (e.g. from the FAO) cite large areas of uncultivated arable land, they seldom analyse the economic and environmental costs of bringing such land under production. Economic costs include the investment cost of infrastructure as well as the costs of human and animal disease control necessary to open these areas to farming.

Potential infrastructure costs are staggering: the proportion of land under irrigation in sub-Saharan Africa is currently less than a quarter of that of India in 1961, at the dawn of its green revolution. Increasing the percentage of irrigated land in SSA to Indian levels in 1960 would cost approximately \$114 billion. Similarly, sub-Saharan Africa's road density, at 201 km/1000 km², is less than a third of that of India in 1950 (703 km/1000 km²). Even Rwanda, the continent's most densely populated country, does not have the road density of India in 1950. Today's gap is even wider: India's road density is 32 times that of Ethiopia and 255 times that of

the Sudan (Staatz & Dembélé 2008). Furthermore, agricultural area expansion in sub-Saharan Africa often involves deforestation (with implications for global climate change) and loss of critical wildlife habitats. Thus, while a few countries, such as Zambia, may have scope for sustainable agricultural growth through area expansion, the critical question facing the continent is the relative cost of area expansion versus intensifying production on existing land.

The low productivity of agriculture is in part a function of the low-level of use of industrialized inputs (Table 3.2). Less than 4 per cent of sub-Saharan Africa’s arable land is irrigated (compared with nearly 39 per cent in South Asia and 11 per cent for Latin America and the Caribbean), resulting in both lower and more unstable yields for most major staple crops. Similarly, the intensity of fertilizer and agricultural machinery use is one eighth to one tenth of that in South Asia. Intensity of manufactured input use varies widely across the continent; West Africa’s use of these inputs is about a third of that of countries in the South African Development Community (SADC) region and between a 20 per cent and 25 per cent of that in countries in the Common Market for Eastern and Southern Africa (COMESA) (UNECA & African Union 2009). In part, this reflects lower population densities and higher inherent soil fertility in some parts of West Africa as well as the greater incidence of large-scale farming in South Africa and Namibia.

Table 3.2: Use of productivity-enhancing technologies in farming 2001-03

Region	Irrigated Land (percentage of crop land)	Fertilizer Consumption (kg/ha of arable land)	Tractors per 100 km ² of arable land
East Asia and Pacific	N.A.	N.A.	89
E. Europe and Central Asia	11.2	34.7	185
Latin America & Caribbean	11.4	89.6	123
Middle East & North Africa	32.7	83.3	142
South Asia	38.9	106.7	129
Sub-Saharan Africa	3.6	12.5	13
Europe (European Monetary Union)	17	205.9	1002

Source: World Bank data cited in UNECA & African Union (2009 p. 126)

Over the long term, increasing the use of inputs like fertilizer will be critical to increasing farm-level productivity, incomes and competitiveness. A 2009 World Bank study on the competitiveness of commercial agriculture in Africa compared the on-farm per-unit production costs for several agricultural products produced in the Guinea-Savannah regions of Africa with production costs for the same products in Brazil and Thailand. The study showed that while African farm-level costs were comparable to those in Brazil and Thailand, this ‘competitiveness’ was based on soil mining (the depletion of soil nutrient reserves, leading to soil degradation) and extremely low returns to labour, reflecting few alternative employment oppor-

tunities for workers—hardly a model for poverty reduction (World Bank & FAO 2009)¹⁷.

While labour productivity in agribusiness varies significantly amongst different African countries, not only is productivity low by international standards it has stagnated over time (Table 3.3).

Country	1998	2002	2006
Botswana	6,868	5,955	9,484
Eritrea	3,842	3,761	3,593
Ethiopia	4,867	4,925	5,547
Mauritius	12,167	11,996	12,597
South Africa	11,527	13,023	34,996
Australia	67,045	41,251	76,777
United States	110,212	132,299	183,734

Source: UNIDO (2009a)

Productivity levels in African agribusiness are low partly because educational levels fall well short of the standard required to achieve technical efficiency in agriculture and manufacturing. In rural areas in sub-Saharan Africa, North Africa, South Asia and the Middle East adult males have about 4 years of education and females even less (1.5 to 4 years), whereas in Central Asia and Europe education levels are much higher (World Bank 2007a). Health and literacy standards are similarly poor.

Box 3.1: Impact of climate change on agro-industry in sub-Saharan Africa

Climate change poses an additional, serious challenge to increasing agricultural productivity in SSA. Although models differ in their projections of the scale and scope of impacts, they generally agree on three points (World Bank 2007a; von Braun 2007; UNIDO *et al.* 2008):

- The variability in weather events is likely to increase, implying higher risks for farmers and others involved in agro-food systems—often those with least capacity to bear such risks. For example, increased risks of droughts and floods due to higher temperatures are likely to lead to greater crop-yield losses.
- As a whole, sub-Saharan Africa will be harder hit than other regions of the world by higher temperatures and reduced rainfall, in part because some crops grown in Africa are already produced at the limits of their heat tolerance.
- The impacts across Africa will not be uniform. For example, the Sahel and parts of Southern Africa are already becoming drier than in the past, while rainfall levels are likely to increase in some other areas, such as parts of East Africa.

Overall, these climate change impacts are likely to increase the import-dependency of many African countries for some of their staple foods. They are also

17. The same study showed that while African production was competitive at the farm level, it was not competitive in international markets, due largely to high transport, logistic and transaction costs—problems addressed later in subsequent chapters.

likely to put increased pressure on agricultural research systems to develop varieties that are more heat and drought-stress tolerant. Efforts to mitigate climate change may, however, offer some new opportunities to African agriculture. If the institutional implementation arrangements can be worked out to link African farmers to world carbon markets, there is a potential for carbon sequestration among small farmers to become an important new 'cash crop' in SSA, and better management of agricultural by-products and manures can lead to greater local production of biogas to fuel farm and agro-processing operations (World Bank 2007a).

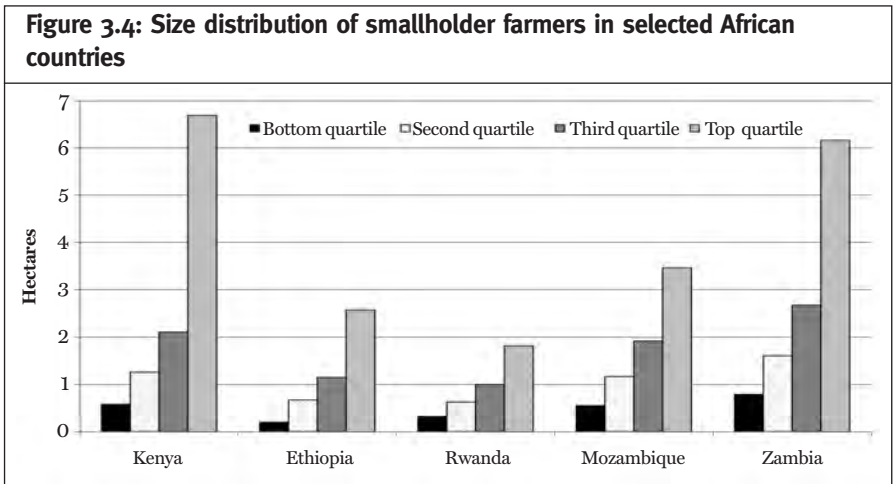
Heterogeneity of African agriculture

There is tremendous heterogeneity in agriculture across sub-Saharan Africa. Furthermore, the figures for cereal yields may overstate the lack of productivity growth in African agriculture as substantial diversification has taken place in some countries away from basic cereals into higher value products and other staples, such as cassava that have had recent major productivity-enhancing breakthroughs.

The huge size and agro-ecological diversity of the continent leads to a wide range of farming systems, suggesting that a single path to a transformation of African farming and related agro-industry is unlikely. The FAO identifies 14 major farming systems in sub-Saharan Africa, ranging from near desert to forest-based systems, with significant variation within each major category (African Development Bank *et al.* 2007). In contrast to the Asian countries that were at the heart of the green revolution, few African countries are heavily reliant on rice and wheat (two of the three key green revolution crops); and maize (the third green revolution staple) is dominant only in Southern Africa. Sub-Saharan Africa's diverse agro-ecologies lead to a wide range of farming systems and reliance on a broad number of staples—cassava in central Africa and millet and sorghum in the Sahel—along with significant reliance on livestock in most farming systems. Accordingly, more varied processing and input technologies for staple crops are required than those that existed in Asia at a comparable stage of agricultural development.

Not only is African agriculture highly heterogeneous but so are African farmers. Although the differences between large commercial farmers and smallholders in countries such as South Africa and Zimbabwe are evident, what is often less appreciated is the diversity among smallholders themselves. African agriculture is predominantly smallholder, but those smallholders vary tremendously in terms of their access to resources, such as land (Figure 3.4), market access and the degree to which they are able to produce a marketable surplus (Jayne *et al.* 2006; Jayne *et al.* 2003; Weber *et al.* 1988; Zezza *et al.* 2006)¹⁸. Surveys conducted in Ethiopia, Kenya, Mali, Mozambique, Rwanda, Senegal, Somalia, United Republic of Tanzania, Zambia, and Zimbabwe between the mid-1980s and 2002 found that in no country were more than half of the smallholders net sellers of staples; the modal figure is closer to one third. In Ethiopia only 25 per cent of smallholders were net sellers of either teff or maize, and only 25 per cent were net sellers of maize in Mozambique.

18. In the countries reviewed, 'small-scale farming' is typically defined as including farm sizes of less than 10 hectares; in the analysis of farm size showed in figure 3.3, the Zambian data also include farms of up to 20 hectares (farm sizes of 5-20 hectares are classified as 'medium-sized' farms in Zambia). For details, see (Jayne *et al.* 2003).



Source: UNIDO based on data in Jayne *et al.* (2003)

In many African countries land availability per person in farming has halved over the past 40 years and not only is it falling, but its distribution, even among smallholders, is highly unequal. Gini coefficients of rural household land *per capita* among smallholders for Ethiopia, Kenya, Mozambique, Rwanda, Zambia and Zimbabwe range from 0.50 to 0.56 (Jayne *et al.* 2006) comparable to or higher than those estimated for much of Asia during the 1960s and 1970s (Haggblade *et al.* 2007). Were large-scale farms included, the inequality of landholdings would rise even further.

Frequently, the bottom half of the size distribution of smallholders has less than one fifth of a hectare available per person, making these households close to landless. These are frequently also the most constrained in terms of access to capital and improved inputs. Given their constrained resources, it will be difficult for these households to climb out of poverty solely through farming, particularly the production of lower-value staple crops. Although there may be more scope for raising incomes on limited land through the production of higher-value horticultural and livestock products, these typically require higher levels of management skills and coordination with input and output markets, which may be outside the capacity of smallholders with very limited resources. Thus, expanding employment through downstream activities in the value chains for these products, including local agro-industry, will be essential for poverty reduction under such circumstances.

The good news is that the rural poor generally are not geographically isolated from the better-off smallholders in sub-Saharan Africa. Evidence from Kenya, Mozambique, Zambia, Ethiopia and Rwanda show that most often the smallholders with the lowest resources are neighbours of the better-off (Jayne *et al.* 2006). Approximately 70 per cent of sub-Saharan Africa smallholders are located in areas with good market access—defined as within 5 hours travel to a market of more than 5,000 (World Bank 2007a). This proximity implies that market-driven agricultural growth has the potential to deliver a stronger indirect effect (through linkage effects) on poverty reduction than if the poor were more geographically isolated.

Heterogeneity of African agro-industry

Similar to African farming, which is highly diverse dominated largely by small-scale holders, the African agro-industry is also dominated by small and medium scale enterprises. The enterprises vary along at least three dimensions: scale, technology used and legal status (formal or informal sector). Ilboudo & Kambou (2009) propose a typology of agro-industry in West Africa, which could be applied more broadly to all of sub-Saharan Africa, that includes four categories of enterprises: artisanal (micro), semi-artisanal (small), semi-industrial (medium) and industrial (large) (Table 3.4). Their 'artisanal and semi-artisanal' categories include the smallest scale firms that use the simplest technology and are frequently in the informal sector¹⁹. In SSA, the bulk of agro-industrial enterprises (approximately 75 per cent in West Africa) fall into Ilboudo and Kambou's artisanal and semi-artisanal categories.

Similar to the smaller farms, the smallest of these agro-industrial enterprises in the artisanal category face severe constraints to their potential for growth and income generation. Both are marked by very low returns to labour and low productivity of other resources, often serving as what de Janvry (2009) terms 'sources of hidden unemployment.'

Among the constraints are their very limited market access (focused primarily on low-income consumers within the village or neighbourhood where they are located); reliance on agricultural raw materials that are of highly variable availability and quality (a function of the production constraints facing the small farms that produce these goods); poor access to inputs—appropriate machinery and packaging as well as financing; inadequate access to appropriate information on technologies and market demand; and weak managerial capacity. Many of these constraints are linked to the weak organizational capacity of the firms for joint action, both at a given level within a value chain (e.g. small-scale grain milling) and vertically among different levels in the value chain.

Accordingly, it is unlikely that an exclusive focus on the smallest firms in agro-industry will lead to economic growth and poverty reduction. This does not mean, however, that emphasis should be exclusively on the promotion of large-scale agro-industry, which focuses primarily on overseas exports and a limited population of middle and high-income consumers in national markets. Just as in farming, where a number of studies have shown that, with limited exceptions, large-scale enterprises in SSA do not have significant scale economies relative to the larger of the small-scale farms (World Bank 2007a; World Bank & FAO 2009), it appears that some of the greatest growth potential for African agro-industry lies in the SMEs, especially in helping them expand and capture (or recapture) national and regional markets (Ilboudo & Kambou 2009).

A focus on helping SMEs grow, however, should not exclude considering the possibility of also fostering growth of large-scale agro-enterprises in situations where

19. If one interprets 'artisanal' as representing small-scale firms using largely non-mechanized technology, it is not always true that such firms are in the informal sector. In some value chains, particularly in industrialized countries, artisanal production is targeted towards high-income consumers as 'traditional' or 'homemade' products and fetches a high price (source: Alain Sy Traoré of the Economic Community of West African States (ECOWAS) Commission for Agriculture, Environment, and Water Resources).

Characteristics	Artisanal	Semi-Artisanal	Semi-Industrial	Industrial
Scale	Microenterprise	Small enterprise	Medium enterprise	Large enterprise
Labour	Family or social	Family	Large and moderately specialized	Large and specialized
Products	Traditional products, often 'humid' with a short shelf life	More or less standardized products, stable shelf life	Diversified products with stable shelf life	Products that meet grades and standards; branded products
Organization	Informal enterprise. Little or no organization (embryonic)	Beginning to be organized	Formal; separated functions of employees; accounting systems	Very modern (Administrative units, divisions and departments)
Investments	Small to none. Operations are essentially manual	Some machines	Important mechanization	Important and modern
Production	Low level of production	Regular and larger level of production	More mechanized processes	High capacities for production
Types of Markets	Local and very targeted	Local distribution	National distribution and sometimes subregional	All markets (local, regional, overseas)
Distribution	Short distribution channels; direct sales to consumers	Direct sales and/or by intermediaries	Long distribution channels	Long and professional channels
Est. share of total processing firms in West Africa	75%		20%	5%

Source: Ilboudo & Kambou (2009)

scale economies are large (e.g. in fertilizer production) and where export opportunities exist. The rising costs of water and land can be expected to raise production costs in semi-arid areas of North America (e.g. California) and Asia (e.g. northern China), which may open new market opportunities in some coastal African countries. Experience in Senegal shows that exports of high-value crops by large-scale firms, can have important poverty reduction impacts (de Janvry 2009).

3.3. Value addition in the context of structural transformation

Value addition versus processing

Value addition in the agro-food system is often confused with processing, which changes the form of the product. Value can be added to products without changing their physical form and processing (in the sense of changing the form of the product) does not necessarily add value to the product. Value addition does involve processing in the sense that the product undergoes some process (which can just involve cleaning, grading, or labelling), after which a buyer is willing to pay a price for the product that more than compensates for the cost of the inputs used in the process. Sorting a heterogeneous mix of mangoes into high-quality fruit targeted to the fresh fruit export market and lower-quality fruit targeted to juice production for local consumption allows a firm to separate markets and practice price discrimination by charging higher prices in export markets for high-quality fresh mangoes, thereby increasing its earnings. In a market economy, this added value is typically manifested by the processor earning a profit.

In contrast, where processing uses resources that are worth more than the additional amount buyers are willing to pay for this processed product relative to the raw product, value subtraction rather than value addition occurs. A classic example in West Africa was the construction of refrigerated abattoirs in several Sahelian countries during the 1960s and 1970s, with the aim of exporting fresh meat to coastal countries. The motivation was to substitute the export of fresh meat from the Sahel for the export of live animals (cattle, sheep, and goats) to the coast, thereby capturing the value added of processing in the livestock exporting countries. In practice, almost all of these efforts failed, in part because refrigerated transport of meat from the Sahel to the coast was more costly and unreliable than the transport of live animals.

Another important yet underappreciated factor was the much higher value that could be attained on the coast for the offal and other by-products of the slaughtered animal (hides, hoofs, horns, etc.)—the so-called ‘fifth quarter’. Because coastal residents consume as food or transform many more of these products than do Sahelians, they are willing to pay a much higher price for them. And because many of these by-products are perishable, they are hard to ship from the Sahel to the coast without extensive processing—unless they are shipped as part of a living animal. As a consequence, traders involved in the export of live animals could afford to pay more for export-quality animals than could firms involved in the meat export business. Local slaughter for export became a money-losing proposition—a value subtraction activity rather than value addition (Makinen *et al.* 1981).

Value addition, agro-industry, and the process of structural transformation

Nearly every economy where living standards have risen substantially has undergone structural transformation, whereby the proportion of the total population engaged in farming falls as does farming’s relative contribution to national income (Box 3.2). In the long run, structural transformation involving a net resource transfer from farming to other sectors of the economy is critical for poverty reduction in

sub-Saharan Africa, as somewhere between one and two thirds of smallholder farmers (depending on the country) appear to lack the resources to “farm their way out of poverty” and will therefore need eventually to move to more remunerative employment outside farming (Staatz & Dembélé 2008).

Structural transformation involves a reorientation of the economy away from subsistence-oriented, household-level production and household-based agro-industry towards an integrated economy based on greater specialization, exchange and capturing of economies of scale (Reynolds 1985). Many functions formerly conducted on the farm, such as input production and output processing, are shifted to off-farm elements of the economy. Farmers rely more on external sources of power (e.g. diesel-powered pumps) and less on producing that power themselves through human or animal power. Milk is sold to creameries rather than processed into butter on the farm. Thus, resources shift within the agro-food system, as well as between the food system and the rest of the economy so that off-farm players in the food system—agribusiness and food retailing—grow relative to farm-level production in terms both of value added and employment (chapter 1).

One implication of this process is that driving down the real cost of food to consumers—critical to poverty reduction because low-income Africans spend a high proportion of their incomes on food—demands increased attention to fostering technical and institutional changes in both off-farm agro-food activities and farm production. Increasing farm productivity is an essential, but not a sufficient condition to reduce the real price of food and to ensure that African agribusinesses are competitive internationally.

A second implication is that reduced transaction costs are a prerequisite for structural transformation. High transaction costs (difficulties in dispute adjudication and contract enforcement and demands for bribes at borders) can choke off structural transformation by making it too costly for people to rely on the specialization and exchange necessary to take advantage of new agro-food technologies. Structural transformation also involves the increased integration of actors in the agro-food system into broader, often global, knowledge systems. Invariably such knowledge is embodied in new technologies, management practices, institutions and professional networks that develop and exchange such knowledge. As economies transform, economic growth depends increasingly on embodied knowledge and knowledge transfer. Structural change within agriculture is dominated by the shift from diversified, but subsistence-oriented farms, towards more specialized market-driven production. Accordingly, transformation involves increased integration of farming and agro-industry, as well as of the entire agro-food system with other sectors of domestic and global economies.

In the early stages of agricultural-led growth, agricultural production and exports are usually dominated by bulk agricultural commodities, for which natural resource endowments (and transport infrastructure) are key determinants of comparative advantage. As countries move more into production of higher value agro-food products, competitive advantage is increasingly determined by investments in human capital, research and development, and logistics (Table 3.5) (Abbott & Brehdahl 1993).

Determinants of Competitiveness	Production, Assembly, Transformation (Processing) & Final Distribution of:			
	Undifferentiated primary commodities	Differentiated primary products	Semi-processed products	Consumption ready products
Natural resource advantage, factor endowments	Generally critical, but the mobility of technology is likely reducing its importance.		Little importance, but varies with the mobility of primary outputs.	Little importance, but varies with mobility of primary and semi-processed products.
Cost-reducing technology	Mandatory, but technology is increasingly mobile.	Some importance, but product differentiation requires certain characteristics be reflected in production practices; technology is generally mobile.		
Human capital and managerial expertise	Some importance; skills application of production technology important, many people involved.		Great importance; skills are critical, especially in organization and coordination of activities, with fewer people involved.	
Quality-enhancing technology	Some importance: Quality, transportation, etc.	Some importance: Quality, transportation, etc.	Great importance; end-use characteristics most important.	
Product characteristics and non-price factors	Some importance: grades and standards provide information.	Moderate importance: product differentiation possible through quality differences.	Great importance: degree of product differentiation and other activities determine the amount of value added.	
Firm strategy	Minimum cost is only feasible strategy.	Some importance: cost and differentiation are possible strategies.	Great importance: cost leadership and product differentiation, or a combination may be pursued.	
Industry structure input supply, marketing and distribution	Some importance: markets provide vertical coordination.	Importance varies; policies greatly influence competitiveness and trade patterns. But, often the policy impacts are indirect. Technical barriers matter most.		
Infrastructure	Important to cost competitiveness.		Important to cost competitiveness, product differentiation, and innovation.	
Regulatory environment and trade policies	May determine trade patterns.	Importance varies; policies greatly influence competitiveness and trade patterns. But often, the policy impacts are indirect. Technical barriers matter most.		

Source: Abbott & Brehdahl (1993)

3.4. The prime movers in transforming the agro-food system

The competitiveness of a value chain within the agro-food system depends on the efficiency of the physical transformations that take place at each individual stage of the chain (e.g. transformation of fruit into juice) and the coordination among the various stages within that chain. Coordination failures (e.g. the failure to deliver key inputs on time) can undermine the productivity gains achieved by improved technology. This means that both the development of technologies and coordination arrangements within the vertical chain are mutually interdependent (Boughton *et al.* 1995). Increasingly, competition in agro-food systems is defined not at the individual industry level (e.g. grain milling) but between different vertical chains (Boehlje & Schrader 1998). Thus, this section focuses on the five prime movers of productivity growth and competitiveness throughout the vertical chain in sub-Saharan Africa. These are (a) the institutional and infrastructural enabling environment; (b) access to key technologies; (c) arrangements for horizontal and vertical coordination among actors in the agro-food system; (d) access to markets; (e) managerial capacity; and (f) access to finance (addressed in chapter 7).

a) The enabling environment

The enabling environment for the agro-food system involves two broad components: (a) the policy and regulatory environment under which the system operates; and (b) the availability of basic infrastructure including power, communication, water and transportation.

The policy and regulatory environment: Africa has made major strides over the past 20 years in improving the macroeconomic environment for agro-food development over the past two decades (World Bank 2007a). Fiscal and monetary reforms have reduced inflation in most countries, improving the planning environment for firms. More competitive exchange rates have made local production and exports, particularly to regional markets within Africa, much more competitive with agro-food products from outside Africa and reduced foreign exchange shortages that previously constrained imports of key machinery, spare parts and inputs such as fertilizer.

Although enterprise size is strongly influenced by scale economy considerations, interest rates play a crucial role to the extent that the choice among alternative technologies is driven also by relative factor prices. Subsidizing capital for the purchase of tractors or processing equipment may induce firms to adopt capital-intensive, labour-displacing technologies in situations where labour is abundant and cheap while capital relatively expensive. Moreover, where property right enforcement is weak, smallholder farmers have been dispossessed and their land taken over for large mechanized farming operations. Brazil's development of its Cerrado region (Box 1.2), while impressive, had adverse consequences for the indigenous population which cannot be ignored. Therefore, recent moves to encourage more large-scale farming in some African countries should carefully consider these risks in following a similar path (World Bank & FAO 2009; von Braun & Meinzen-Dick 2009; GRAIN 2008).

Trade policy issues are hotly debated both in the context of protection against extra-African imports and regulations relating to intra-regional trade. Under debate

is whether African countries and economic communities should use tariffs to protect the local production of ‘sensitive’ products, and if so, to what degree. The Economic Community of West African States (ECOWAS) common agricultural policy calls for “reducing food dependency in a perspective of food sovereignty” (ECOWAS 2009), which has meant protecting West African production against imports through the imposition of a common external tariff. Proponents of this policy argue that it will be very difficult for agribusiness to prosper and modernize when markets are inundated by low-cost (sometimes subsidized) products from abroad. This is the familiar infant-industry argument, of which many of the criticisms—particularly about the infant never growing up—are well known (Christy *et al.* 2009).

However, while the treaties creating African regional economic communities call for the free movement of goods within the communities, the reality is that there are very large non-tariff barriers—in terms of road check points, costly administrative procedures and illegal payments—that constrain regional trade and often even intra-country trade within individual member countries. Until these barriers are reduced, increased protection against extra-regional imports will simply protect the revenues of the rent-seekers, who create such barriers to regional and intra-country trade, rather than benefit the entrepreneurs in the agro-food system, who are trying to grow their businesses.

Beyond trade policy, there are a number of institutional, legal and administrative factors that influence the ease of doing business (Christy *et al.* 2009). These include the ease of contract enforcement and dispute adjudication, protection of property rights, the costs of establishing a firm (‘becoming formal’), the openness of the state to public-private partnerships to ease financing, and support of applied agricultural and agribusiness-related research, as carefully documented in the World Bank’s annual *Doing Business* reports.

Infrastructure: Availability of key infrastructure, such as roads, water, telecommunications and electricity, is crucial to developing competitive agro-industries (chapter 9). The lack of reliable and low-cost electrical power severely constrains the development of cold chains that are critical for maintaining quality of potentially high-value perishable products such as fruit and dairy products and interruptions of electrical power greatly increase costs of agro-processing. Processors face the costly choice of throwing out goods in the processing line every time electricity is cut to the plant or investing in costly generators to assure a continuous supply of power.

Similarly, the availability, quality and cost of water will be an increasingly important factor in the location and profitability of farming and agro-industry in the twenty-first century. Agro-industries and farming are typically heavy users of water. Climate change, increasing population pressure, and rising energy costs (which affect pumping costs) are all making water increasingly expensive worldwide. However, changes in the cost of water across different regions will likely affect where large international agribusinesses choose to source their products, giving water-abundant areas in Africa a potential advantage if they can create the other elements of the enabling environment to attract such investment. Current pricing structures for water often encourage its overuse, undermining long-term sustainability of water-intensive farming and agro-processing. A number of new water-saving tech-

nologies and institutional arrangements are currently or potentially available to address these challenges. Since many of the large aquifers and river basins in sub-Saharan Africa are shared across countries, however, developing appropriate approaches will frequently require regional cooperation and joint management (AfDB *et al.* 2007).

b) Access to technologies

Improving the efficiency of the physical transformation that takes place at each stage of the agro-food system and responding to rapidly changing consumer demands for different attributes in their food (increased assurance of food safety, 'greenness', nutritional quality, etc.) requires access to improved technologies. Dennis *et al.* (2009) provide a detailed discussion of forces driving technological development in the agro-food system and of the promising technologies on the horizon to respond to changing consumer demands and environmental conditions facing agro-food producers.

Two key technological issues that will be critical in helping determine the competitiveness of the agrifood system in sub-Saharan Africa in the coming decade stand out: (a) access to essential inputs; and (b) access to technologies—packaging, quality control and communication—that influence the quality of processed products and communicate that quality to consumers.

With respect to improved access to critical agricultural inputs, top priority should be accorded to measures designed to improve access to the critical agricultural inputs—fertilizer, crop protectants, germ-plasma and machinery—that drive the quality and sustainability of the supply of agricultural raw materials to agro-industry. The ability of sub-Saharan Africa to sustainably produce agricultural products, including raw materials for agro-processing, is threatened by declining soil fertility throughout the subcontinent. Population pressure has rendered traditional techniques of soil fertility management through use of long bush fallows obsolete, as farmers are increasingly forced to keep land in continuous cultivation. In many areas, the competitiveness of farm-level production is based on mining nutrients from the soil—clearly an unsustainable strategy (World Bank & FAO 2009).

While increasing organic matter in the soil is one important part of any solution, sustained increases in productivity from the very low average levels shown in Table 3.2 will only be possible with very large increases in the use of inorganic fertilizers. Yet the incentives to use fertilizer have been muted by high fertilizer costs relative to the price of outputs. The ratio of grain prices to fertilizer faced by African farmers was historically much more unfavourable to the adoption of fertilizer-responsive modern varieties than was the case in Asia during the green revolution (Heisey & Mwangi 1997), due in part to the lack of economies of scale in importing fertilizer in countries where demand is limited. Other factors making for expensive fertilizer supply include high inland transport costs, which reduce farm-gate grain prices and increase farm-gate fertilizer prices, policy uncertainty about whether government will itself sell subsidized fertilizer, thereby discouraging private investment in fertilizer distribution systems, and high costs of local production due to issues of scale and high energy costs.

In 2006, the price of fertilizer in the United Republic of Tanzania was 49 per cent higher than that in Thailand, while in Mali it was 80 per cent higher. The differences were due largely to higher per-unit costs of transport, taxes, financing and marketing margins (Amit 2009). Furthermore, because so little of African farmland is irrigated and markets are frequently thin, both yields and prices are more variable than in much of Asia, increasing the financial risks to farmers of using fertilizer. In addition, the dearth of technical information available to most farmers about which fertilizer formulation is most appropriate for their soil conditions and crop choice greatly reduces the efficiency of fertilizer use²⁰. Hence, developing more efficient fertilizer value chains involving both domestic production and imports is one of the critical challenges for building competitive agro-industries in Africa.

Because scale economies are so important in both production and international trade of fertilizer, subregional cooperation among African countries is needed to capture lower per-unit costs of imported and locally manufactured fertilizers. Morris *et al.* (2007) argue that reducing intra-regional trade barriers, adopting common quality standards, and harmonizing approval processes to increase the size of national and regional markets are critical steps needed to allow fertilizer importers and manufacturers to capture these economies. Similar issues of subregional cooperation and specialization arise in the manufacture of certain types of agricultural and agro-processing equipment, such as tractors, other heavy agricultural equipment, and specialized processing equipment, as few sub-Saharan Africa national markets are large enough to support such industries at efficient levels.

The ability to access and use crop protectants such as pesticides safely, is critically important for the health of farm workers and consumers. It is also essential if African agro-food producers are to access increasingly stringent markets in high-income countries, that certification and control systems ensure such products are used safely, and that the resulting output is free of harmful residues. A distinguishing characteristic of these inputs is the high level of technical information required to safely use them. The scope for misuse by poorly educated farmers and farm labourers is great, especially in the presence of weak regulatory frameworks and enforcement mechanisms that can result in products being imported that are out of date or not permitted in other regions of the world, and their use in ways other than those for which they were designed (application on the wrong crops, in the wrong doses and/or with the wrong timing). The problem has been compounded by the plethora of national regulations across Africa and the small size of individual markets, which reduces incentives for foreign producers of these products to tailor the inputs to local needs, or to invest in the extension of technical knowledge on use of the products to input dealers and farmers.

A critical need, therefore, is to develop more uniform and consistent regulatory frameworks for the importation, distribution and use of these products. In West

20. Low efficiency of fertilizer use also increases the cost to government of any fertilizer subsidy it extends to farmers. Improving the efficiency of fertilizer use, both through better matching of fertilizer formulations to individual farmers' needs and through techniques, such as microdosing, which deliver plant nutrients directly to plant roots at the time they need them most, are alternatives to fertilizer subsidies, which have expanded widely, at high cost, following the world food crisis of 2007/8.

Africa, the Permanent Interstate Committee for Combating Drought in the Sahel (CILSS), an interstate organization that covers nine countries, has developed a system of regional review and certification of pesticides used in its member states that attempts to address this problem of harmonization. The Sahelian Pesticide Committee (SPC), which pools scientific expertise from across its member states, reviews the technical applications of pesticide manufacturers and importers for sale of their products for specific uses and either authorizes, limits, or bans the use of the products within the subregion. As of January 2010, 471 different pesticides were included in the SPC on-line database (Sahel Institute 2010) of which 60 were banned for all uses in CILSS countries and many others had various types of restrictions on their use. While the CILSS approach illustrates some of the potential of such regional approaches to regulation in order to gain economies of scale, the weakness has been the limited national funding of national committees charged with enforcement of the regulations for pesticide management in the individual member states (Toe 2009; ECOWAS 2005; Me-Nsope *et al.* forthcoming; Staatz & Dembélé 2008).

Improving availability and access to better germ plasm for both animal and plant production is critical to assuring a reliable supply of quality raw materials for agro-processing. Rapidly changing consumer demands and environmental conditions (climate change, spread of zoonotic diseases such as avian flu and the emergence of new crop pests) require an ongoing stream of new germ plasm to maintain and enhance productivity. In much of sub-Saharan Africa, public support for agricultural research and training of scientific personnel to undertake it stagnated or withered from the 1980s through to the 2005 (Nienke & Stads 2006). Private research focused on a few profitable export crops but there were few private-public partnerships such as those that have characterized dynamic agricultural research systems, such as that of Brazil (Pardey *et al.* 2006). Advances in biotechnology offer the potential to respond to some of the challenges of adaptation, productivity enhancement and development of new products for emerging new demands (e.g. for nutraceuticals), but concerns about its safety, consumer acceptance (particularly if products are exported to high-income countries) and environmental impacts and shortages of expertise have led to very few countries developing the biosafety standards necessary for the introduction and testing of bioengineered crops or animals. As of 2006, only one country in sub-Saharan Africa, South Africa, was growing any genetically modified crops commercially (Eicher *et al.* 2006), although testing of Bt²¹ cotton has recently begun in a few others (e.g. Burkina Faso and Mali).

The challenge for public policy with respect to access to improved germ plasm revolves around three issues: providing adequate funding for national and regional agricultural research systems and systems of agricultural higher education (to train the next generation of agricultural scientists and technicians); creating frameworks conducive to greater public-private partnerships in research (including resolving

21. *Bacillus thuringiensis* (or Bt) is a soil-dwelling bacterium, commonly used as a biological alternative to a pesticide. Through genetic engineering, scientists have introduced the gene responsible for making the toxin into a range of crops, including cotton, reducing the reliance on insecticides.

knotty problems about ownership of any intellectual property that results from such partnerships); and developing the regulatory framework to govern use of various forms of biotechnology in agriculture. Given the small size of most national agricultural research systems in Africa, over half of which had fewer than 100 scientists in 2000 (Nienke & Stads 2006), regional collaboration will need to be a large component of this effort. The renewed interest in African agriculture by African governments, development partners (including the 'new philanthropists' such as the Bill and Melinda Gates Foundation) and foreign investors since 2005 offers some hope that these constraints will begin to be addressed.

The question of the appropriate scale of agricultural and agro-industrial equipment adopted in various operations is complex and can have major impacts on how strongly the agro-food system acts as a driver of job creation, as the availability and cost of machinery determines, in part, the ability of the system to respond efficiently to changing consumer demands. Unfortunately, too often in Africa, government leaders equate large-scale with modern. The basic physics and biology of certain processes (land levelling, conversion of nitrogen into urea, tomato paste processing, and primary processing of sugar cane) dictate that they be carried out using large-scale, capital-intensive equipment to garner the least cost. Insisting that such operations adopt smaller-scale, labour-intensive methods of production would not only make them less competitive against international competitors, but drive up production costs for buying firms that use their outputs as inputs into subsequent stages of production (e.g. farmers using urea fertilizer), thereby compromising output and employment growth in downstream segments of the agro-food system. In situations where scale economies are decisive to the manufacture of agricultural machinery and agro-processing equipment, regional cooperation and specialization in the location of plants, while desirable, is often difficult to achieve because every country wants to attract manufacturing investment. Prospects are likely to be most promising in the few African economies where the engineering industry is well developed, such as in Egypt and South Africa, although competition with imported machinery and equipment is very strong.

In other cases, however, a much wider range of technological options may exist, with the economically optimal choice depending on relative factor prices and the required timeliness of operations required. One example is land preparation, where animal-traction equipment, hand tractors and large-scale tractors are all options. The choice depends on such aspects as the heaviness of the soil to be ploughed, the rapidity with which the operation needs to take place (for example, in order to accommodate multiple cropping within a single year), the availability of maintenance services and spare parts, and the relative prices of labour and capital.

For both agricultural machinery and agro-processing equipment, a range of simpler, more labour-intensive, but economically efficient, technologies is often available. The widespread importation into sub-Saharan Africa of simple grain mills, pumps, and other agricultural technologies from India shows that when faced with unsubsidized prices, African farmers and processors often opt for such technologies. Shifts in consumer demand can also affect the choice of scale of machinery in the light of multiple options. An example is rice milling where, under

conditions of low-incomes (which not only reduce labour costs but also limit the effective demand for high-quality rice), small-scale mills may be much more economically efficient than large-scale industrial mills. Such was the case in Mali following liberalization of the rice milling industry in 1992, when the new small village-based plate mills drove former state-owned industrial rice mills out of business within two years in the Office du Niger (Diarra *et al.* 2000). The small mills, however, have difficulty producing a consistent quality of milled rice so, as incomes of Mali's small middle class has grown, some millers are shifting to intermediate-scale roller mills (minirizeries) that can produce a more consistent quality rice for this niche market, without substituting large amounts of expensive capital for cheap local labour (Lenaghan 2009).

Critical technologies for agro-processing

Three other important determinants of the competitiveness of African agro-industries are: (a) access to and cost of appropriate packaging technologies; (b) capacities to ensure and certify quality; and (c) the ability to publicize their products to potential clients.

Although exciting new technical developments are on the horizon in packaging for agro-food products (Dennis *et al.* 2009), for many small and medium-sized agro-processing firms in Africa, limited access to, and the cost of, appropriate packaging materials seriously compromise their competitiveness. Faced with these constraints, small-scale enterprises recycle packaging materials (e.g. putting their fruit preserves in old mayonnaise jars), which presents serious potential hygiene problems and precludes these products from all but the lowest-income markets where effective demand for quality is low. Inappropriate packaging reduces the quality and shelf-life of processed food products and can lead to product contamination. For example, the lack of 'breathable' pouches for locally made potato chips leads to their deterioration due to humidity, and hand-held thermal sealers of plastic sachets also do not consistently provide a tight seal resulting in contamination (Ilboudo & Kambou 2009). Constraints exist at three levels: inadequate technical knowledge among some of these agro-processors; the non-availability of appropriate packaging materials linked to the requirement for large minimum order size from foreign manufacturers; and the high cost of packaging materials when available.

The second factor of quality control is crucial, as the ability to guarantee to consumers the quality of food products is essential to compete in international markets and increasingly so in regional and national markets in Africa as well. Yet organizational capacity to implement traceability and food safety (e.g. Hazard Analysis and Critical Control Points (HACCP)) practices, and lack of access to laboratories and other facilities to certify that products meet quality standards, pose serious challenges to small and medium-sized agro-industrial firms. Frequently, developing such quality-control systems represents a large fixed cost, meaning that it is more difficult for SMEs than for large firms to amortize such investments. To address this shortcoming, managerial capacities must be enhanced alongside improved vertical and horizontal coordination among firms within the value chains. Invariably, laboratories and certification firms must also be encouraged.

Regarding communication, even where SMEs produce quality products, communicating this to consumers is a problem. Advertising on radio, TV and billboards involves significant scale economies, while customers of most agro-processing SMEs in sub-Saharan Africa do not regularly use the Internet, a technology that reduces those costs.²² This inability to promote their products puts SMEs at a serious disadvantage. Nagai (2008) found that most mothers of infants he interviewed in Accra in 2007 had not heard of the infant weaning food Weanimix, which has been produced by SMEs for over ten years using a formula developed by the Ghanaian Ministry of Health and the United Nations Children's Fund (UNICEF). In contrast, most of the mothers interviewed knew of and preferred Cerelac, produced by Nestlé, which is widely promoted in Ghana and sells for three times the price of Weanimix²³. Joint advertising of generic products through SME associations could help overcome this problem particularly when linked to the development, and acceptance, of recognized symbols for certified quality, sponsored by the associations.

c) Horizontal and vertical coordination

Horizontal coordination: To enhance profitability, agro-industrial firms need to work together to match the scale advantages enjoyed by large businesses. Such horizontal coordination is frequently achieved through professional associations of millers, food processors or farmers through the provision of services to members—training, research, marketing assistance and political action—to harness market power through bulk purchasing of inputs or marketing economies in the sale of output. At farm level, horizontal coordination takes the form of collective actions by cooperatives, and in the case of agro-industries, by professional associations.

Such organizations may also attempt to set prices for the goods and services produced by their members, though typically such attempts are unsuccessful when numerous members make policing difficult. Often these organizations are also used to facilitate vertical coordination with larger firms either upstream or downstream through contracting (see below). Among medium and large-scale firms, such associations have proven instrumental in providing joint services to their members such as the cell-phone based agricultural brokering service offered by the Zambia National Farmers Union—an association of medium and large-scale farmers. Sometimes, however, their actions reduce consumer welfare as in cases where large-scale maize millers in southern and eastern Africa have used their lobbying influence to restrict competition thereby increasing retail prices (Jayne & Jones 1997; Christy *et al.* 2009).

Vertical coordination: Vertical coordination involves creating incentives for firms along the value chain to integrate their operations in a mutually advantageous

22. Such 'disintermediation' has helped small 'boutique' agro-processors that target upscale consumers succeed in some industrial countries like the US. There may be some scope for this for SSA firms targeting high-income consumers in the North (e.g. with high-quality coffee) if they can assure those consumers of the quality of their products.

23. Nagai also found that grain roasters and retailers in open markets in Accra could produce Weanimix at a cost 20 per cent below of the agro-processing SMEs, but that none of them did so because they lacked the packaging and labelling equipment needed to help assure customers of the cleanliness of their products.

fashion. This can take the form of open markets, contracting arrangements, grading standards, strategic alliances, value chain participant councils and shared ownership. Vertical coordination recognizes that the profitability of activities at one level of a value chain (milling) depends critically on decisions taken at other levels, such as the choice of variety of grain. Accordingly, for the value chain to be profitable for all, participants' actions at different stages must be harmonized.

If all the conditions of the economist's model of perfect competition could be met, relative prices alone would assure such coordination, as they would synthesize all the information available throughout the system about consumer preferences and the marginal costs of responding to those preferences. In the real world, however, many of those conditions (such as all actors having perfect information and no buyer or seller having market power) do not hold, and market prices alone do not ensure efficient economic coordination. Complementary arrangements, such as detailed contracts and joint ventures, are often needed to induce producers along the vertical chain to respond to the demands of others in the chain as well as to final consumers. The inadequate and inconsistent supply of quality agricultural outputs to agro-industries in sub-Saharan Africa is a major constraint on the growth and profitability of agribusinesses. The problem becomes more severe as *per capita* incomes increase in Africa, and as economies become more open, resulting in more stringent quality demands in national and international markets.

A striking example is the case of shea, a tree-based oilseed produced in West Africa that is a major source of women's income. Since the mid 2000s, global demand for shea butter (the oil extract from the shea nut) has increased dramatically following the decision of the European Union to allow up to 5 per cent substitution of shea butter as a cocoa butter equivalent in chocolate and the increased incorporation of shea butter in women's cosmetics in industrialized countries. At the village level, the initial stage of shea nut processing takes two forms—a labour-saving form that involves roasting and burying the nut to allow the outer casing to deteriorate prior to depulping and extracting the oil, and a more labour-intensive method involving boiling and sun-drying the nuts. The roasting and burying method, although quicker and easier for the women involved, produces oil containing polycyclic aromatic hydrocarbons (PAHs), which are known carcinogens. Because of scale economies in collection and processing, nuts processed using both techniques are often pooled at the village level, with buyers paying a uniform price for the entire lot. The result is that the larger lots of nuts and butter often contain PAHs, which can result in rejection of the entire lot for export, forcing it to be sold on the much less profitable domestic market. The absence of clear grades and standards and village-level testing technologies have thus resulted in many women being excluded from the shea boom—a clear vertical coordination failure. In response, Ghana and Burkina Faso have developed training programmes and created value chain consultative processes involving stakeholders throughout the chain to promote improved processing methods at the farm level along with grades, standards and pricing schedules that reward women for undertaking the more time-intensive primary processing procedures (Perakis 2009).

Similar quality control problems are ubiquitous in the agro-food system and become increasingly important as demand in agro-food markets shifts from generic commodities to products that incorporate specific collections of attributes, such as food safety and environmental friendliness. Meeting such demands requires much tighter vertical coordination of value chains than typically can be assured by open spot markets. A critical challenge is to design institutional arrangements (subcontracting and strategic alliances between farmer organizations and processors) for such coordination that offer an alternative to relying solely on vertical coordination of large segments of the value chain through ownership by a single large firm, which may limit the participation of the poor in roles other than low-paid wage labour (Vorley *et al.* 2009).

d) Market Access

Through the late 1980s, many of the diagnoses of the challenges of agro-food system development in Africa focused on supply-side constraints. The agricultural market reforms that began in the late 1980s led to a gradual shift in emphasis towards greater recognition that such development needs to be demand-driven, with the issue of how to link producers throughout the agro-food system to remunerative markets receiving increased attention. A second, more recent, shift has been increasing recognition of the importance of regional markets in Africa as a primary source of demand growth for food products, in contrast to the almost exclusive focus in the 1990s on exports of value added food products to overseas markets.

Access to International Markets: Still, access to international markets, particularly for high-value products such as horticultural goods and processed products, remains important to the development of the growth of the agro-food system in sub-Saharan Africa. Historically, much attention has focussed on the problem of tariff escalation in the Organization for Economic Cooperation and Development (OECD) countries, which makes it more difficult for agro-processors to compete in those markets, and on the possible use of phytosanitary standards by high-income countries as a disguised form of protection (Nouve *et al.* 2002). Today, however, the most important barrier to market access is having to meet the quality and traceability standards established by private importing firms (frequently large retailers) in high-income countries, particularly for SMEs. Consequently it is essential to develop strategies to enable African agro-food enterprises of all sizes, to participate in global value chains (Vorley *et al.* 2009).

Regional and National Markets: Diao *et al.* (2007) showed that the value of regional (intra-African) exports of agricultural products (1996-2000) were more than three times those of exports to non-African markets while regional exports, particularly of staples, were likely to become the largest single source of demand growth for African agro-foods over the next 20 years. Accessing such regional markets is easier for sub-Saharan Africa firms than competing in overseas markets because the logistical demands are less exacting—there is no need to develop expensive air freight facilities—while quality standards are less stringent. Furthermore, national and regional markets not only provide firms with potentially profitable outlets, but also serve as training grounds, in which they can upgrade their operations to eventually break into international markets for high-value products.

Unfortunately, access to regional markets is frequently hindered by a variety of barriers including:

- High transport costs due to poor road infrastructure, outdated trucking fleets and railroad equipment, high fuel costs and poor storage facilities, including cold chains. In the late 1990s, it cost \$230 per ton²⁴ of meat equivalent to ship cattle from the Sahel to the West African coast, compared with only \$80 per ton for beef shipped by non-African exporters from the world market (Yade *et al.* 1999).
- Insufficient information on quantities, qualities and prices of products available in neighbouring countries, as well as contact information about reliable suppliers. This lack of information, compared to relatively easy access to information about overseas suppliers, acts as a non-tariff trade barrier, inducing importers in African countries to favour non-African sources of supply.
- Unreliable systems of contract enforcement and dispute adjudication, particularly when trading across national borders. The development of regional agribusiness professional organizations offers the possibility of using these to develop more reliable tools (e.g. private dispute resolution services) to deal with these problems.
- Numerous non-official barriers, such as roadblocks and bribes to deliver administrative forms, further raise transport costs, increase uncertainty and contradict government commitments to the free movement of goods and people within regional economic communities such as ECOWAS and the Common Market for Eastern and Southern Africa (COMESA). The results are lower levels of trade and reduced incentives to intensify production. For example, Boughton & Dembélé (2010) documented the unofficial charges that traders exporting maize from Mali to Senegal had to pay, in spite of both countries being members of the ECOWAS free trade zone. The charges were the equivalent to the cost of one 50 kg bag of fertilizer at commercial (unsubsidized) prices for every hectare of maize exported—at a time when the Malian government was subsidizing fertilizer at the rate of 50 per cent to encourage intensification of production.

Without a reduction of these restrictions on local and regional market access, African agro-food enterprises will remain disadvantaged relative to foreign competitors, even within markets in Africa.

e) Management

For the smallest agribusinesses—household-level microenterprises—management constraints pose a severe limit on growth. Frequently the ‘border’ between such enterprises and the household is blurred, with no notions of separate firm accounting, employment, or financial flows. Access to information on technologies and promising market outlets is frequently restricted due to the illiteracy of the entrepreneurs. For SMEs, firm management challenges revolve around identifying and adapting to promising markets and technologies, developing contractual relationships with larger actors up and down the value chain and accessing finance. The largest agro-industrial firms are frequently involved in several levels of the value chain, and hence an important part of their management attention is focused on

24. ‘Ton’ refers to metric tons (1,000 kg/2,204.6 lb), unless otherwise stated.

developing improved vertical coordination arrangements, as discussed above, to assure the reliability and quality of their inputs and outputs.

3.5. Overcoming constraints to foster growth

What strategies should African governments and their development partners pursue to overcome the constraints and align and capitalize on the sources of growth for the agro-food system? This section briefly discusses three key issues: (a) deciding on the relative emphasis the state and its partners should give to helping firms; (b) identifying the foci of public actions to promote agro-food system development; and (c) fostering public-private partnerships to improve vertical coordination in value chains.

Relative emphasis: micro, small, medium or large?

Given scarce public resources, what mix of firms should public policies and investments try to foster? The answer depends on the capacity of different sized firms to grow and create wealth and remunerative employment, which in turn depends on a wide range of factors, such as scale and agglomeration economies, ability to respond to rapidly changing demands, and the linkages different scales of firms generate with the rest of the economy. Certainly, there is scope for large-scale enterprises in some areas, particularly in light of growing foreign direct investment (FDI) in sub-Saharan Africa, increasingly from Asia and aimed at serving growing markets on that continent (Broadman *et al.* 2007). For these types of firms, clear foreign investment codes and other elements of the enabling environment are critical. Designing regulatory frameworks that make it easier for them to partner with farmer associations and other suppliers may also be important in helping assure that these enterprises benefit a broad range of actors in the economy, rather than being obliged to organize all their activities internally through their own hired labour. Notably, policies that artificially depress the cost of capital can be detrimental, in that they can induce premature adoption of labour-saving equipment at a time when Africa needs to generate more jobs for its burgeoning labour force.

At the other end of the spectrum are microfirms, typically part-time family operations oriented to a very local customer base and generating very low levels of income. Like the smallest farms, these enterprises are part of poor families' survival strategies, but their growth prospects over the medium term are slim. It may be a more effective use of public resources to foster growth in other segments of agro-industry and then tax some of those earnings to finance programmes that equip the owners of the microenterprises with the tools to move into higher-earning opportunities in the labour market—e.g. through working for the medium or large-scale agro-enterprises. de Janvry (2009) discusses how such a transition to wage labour raised the incomes of former small-scale farmers who shifted to work for green bean exporting firms in Senegal.

Between these two extremes lie the SMEs, some of which have substantial growth potential, particularly to serve growing national and regional markets, but which often need technical, financial, informational and organizational assistance to overcome the constraints discussed above.

Box 3.2: Large-scale farming in Africa: Criteria for promotion

Over time, farm size typically increases, but as the experience of Thailand and Japan illustrate, modernization of agriculture does not inevitably mean large-scale farms of the type that have come to dominate the Cerrado region of Brazil (Hayami & Ruttan 1985; World Bank & FAO 2009). Such farming is attractive in cases where land ownership is available without depriving the smallholder or other stakeholders from their livelihood and further provided that food security is not endangered and environmental sustainability is secured. Undoubtedly, large-scale farming can contribute to food security, employment and income for many including small holders, rural unemployed and the poor.

The critical policy choice is between productivity improvement, and thus lower price and better competitiveness, and the existing landownership and environmental sustainability, as well as food security, keeping in mind population density and related social obligations towards the existing population in the areas concerned. Therefore, land acquisition through FDI must be carefully considered and strictly scrutinized in the light of these criteria. Above all, established and future proprietary rights must be fully respected and enforceable by the legal system. Care should be taken that policies do not suppress the cost of capital and facilitate labour-saving equipment at a time when sub-Saharan Africa is seeking to generate employment for the growing labour force. It should be mentioned that in a long-term perspective, selected European experience has shown that centuries of smallholdings have now been amalgamated into larger agricultural unit operations either through acquisition, rent or joint farming operations.

Foci of public actions

Given the size of the investments needed to attain a growth rate in the agro-food system in sub-Saharan Africa sufficient to bring about a significant increase in incomes and reduction of poverty in the medium term, it is clear that relying solely on investment by African governments and the donor community will be insufficient. Accordingly, a top priority is to create conditions in which local communities, local governments, non-governmental organizations (NGOs) and the private sector (including producers themselves) mobilize their own resources to invest in agribusiness. Identifying these types of investments and public actions, which 'crowd-in' rather than 'crowd-out' private investment, is a key to developing productive public-private partnerships. These public investments and actions largely fall into the category of prime movers described above—favourable enabling environment; market access; access to technologies; and better horizontal and vertical coordination.

Fostering agro-food system growth through Value Chain Participant Councils (VCPC)

One tool that has proved valuable in addressing the challenges of vertical coordination in the agro-food system, both in high-income and developing countries, is the value chain participant council (VCPC). These are subsector or industry councils, also known in francophone countries as *interprofessions*. They offer an alternative way of enhancing agro-food system performance, rather than relying on either (a) top-down state-dominated organization of an industry or value chain or (b) purely private coordination through single-firm ownership of an entire vertical chain.

VCPCs are voluntary organizations, typically organized along value chain lines that involve a broad spectrum of key participants in a specific value chain. Participants typically include representatives from individual firms, farmer and trader organizations, processors, exporters, retailers, other marketing firms, government agencies, input dealers and research and outreach organizations. Such councils are created in response to either a set of perceived threats—increased competition from imports—or opportunities such as a new technology that greatly expands production and raises the need to find profitable new market outlets that individual actors in the value chain cannot adequately address on their own. In other words, the basic motivation for such councils is the identification and creation of critical ‘public goods’, which are essential for successful agricultural development (World Bank 2007a).

The organizing entity for such councils can be either a public or private actor. In some cases the organizer is a ‘channel captain’—an actor that has a broad vision of the issues facing the value chain and is motivated to find a solution (Harrison *et al.* 1987). Motivations include an improved solution that will benefit the actor individually (as well as other stakeholder participants)—as in the case of a large agro-processor—or because helping provide such solutions is part of the actor’s mandate—as in the case of an agricultural research institute. Such councils are most often formed in response to a specific challenge or opportunity—e.g. the need to develop grades and standards that respond to end-users’ demands in a new market—and hence in those cases may be termed ‘task forces’. Stakeholders often realize, however, that the challenges facing most value chains are continually changing so that when one task is completed, several others arise. Hence, there is a strong case for transforming these temporary and narrowly-focused task forces into more permanent bodies with subcommittees handling specific issues as task forces.

At their best, VCPCs operate as instruments for ongoing value chain or industry strategic planning and performance-enhancing action programmes (Lyford *et al.* 2002). Such strategic planning involves priority problem identification and analysis by the stakeholders, along with development of proposals for programmes to improve value chain performance. In some cases, the councils can work with their members to implement the programmes directly; in others, the proposals require government sanction or action so that councils work through the political system to secure the necessary authorization and cooperation.

In carrying out their problem identification, analysis and design of proposals, the VCPCs address a number of fundamental problems inherent in developing effective solutions to improve vertical coordination within value chains that involve multiple and diverse actors. One of these fundamental problems is that the information needed to design a workable solution is dispersed among various actors within the value chain. A second is that actors’ interests frequently conflict. The VCPC provides a structure for consultation and collaboration, pulling together the dispersed information held by various actors to develop a consensual view of the nature of the challenges to be overcome. In the process, actors learn more comprehensively about the perspectives and experiences of others in the chain, which can (but do not always) lead to greater appreciation of the points of view of their ‘rivals’

in the system, thereby fostering greater cooperation. By working together the VCPC can emphasize its members' common interests and the need for a joint approach to improved chain performance. Then, with the council's collective knowledge base of key aspects of the vertical chain, it can develop workable sets of performance-improving actions.

Two examples from sub-Saharan Africa²⁵ illustrate the range of activities such councils can undertake: firstly, in Zambia, the Agricultural Consultative Forum (ACF)—an association that promotes information exchange among farm groups, agribusiness and government—began a series of discussions in 2005 on the potential for greatly expanded cassava production in central and southern Zambia, based on the spread of improved varieties that had earlier been introduced into the north of the country. The potential for rapidly expanding cassava production offered new income opportunities for farmers, processors and agribusinesses if profitable new market outlets for the product could be developed. These discussions led fairly rapidly to the creation of the Acceleration of Cassava Utilization (ACU) Task Force. Since 2005, the Task Force has sponsored feeding trials to assess the suitability of substituting cassava chips for maize in livestock feed in Zambia; examined the market opportunities for exporting cassava chips to the Democratic Republic of the Congo (Zambia's neighbour to the north); evaluated consumer acceptability of composite flours that mix cassava flour with maize flour for the production of various products, such as bread and fritters (a popular fast-food snack in Zambia); and developed proposed new grades and standards for cassava. The latter were subsequently endorsed and implemented by the Zambian Bureau of Standards throughout the country (Chitundu *et al.* 2009). The ACU Task Force still exists, illustrating the point about task forces evolving into de facto ongoing value chain participant councils.

The second example is the case of cotton in West Africa. Throughout Francophone West Africa, the cotton value chain has been undergoing radical restructuring since the early 2000s. Historically, this value chain was organized in each country through single-firm vertical integration (*filière*) run by national monopolies that were joint ventures between individual country governments and the French state-owned multinational firm Dagrís. The integrated system coordinated cotton research throughout the region, provided farmers with inputs and credit, and marketed all their output. However, performance of the system, in terms of overall profitability and prices received by farmers, declined markedly, due to falling world prices from the late 1990s, poor management (a frequent problem with monopolies, especially those subject to strong political influence) and the strong value of the local currency (the Communauté Financière Africaine (CFA) franc, whose value is tied to the Euro).

In an attempt to regain competitiveness, the systems have begun to liberalize various market system functions, such as ginning. Yet, as the competitiveness of individual components has increased, overall vertical coordination has declined. To help fill this vertical coordination vacuum, stakeholders formed interprofessions,

25. See chapter 4 for further details and more examples.

which are value-chain organizations involving representatives of growers, ginners and cotton processors. The *interprofessions* (interprofessional value chain associations) aim to carry out the types of value chain strategic planning and coordination functions previously assured by the old integrated structures while still letting farmers benefit from the new, more competitive value chain structure (Tschirley *et al.* 2009). Thus, these *interprofessions* function as a type of value chain participant council²⁶.

3.6. Conclusions

Agro-industries in sub-Saharan Africa need to undergo a structural transformation as profound as that required of farming over the next 20 years, in order to generate the jobs, incomes and food products so badly needed by Africa's growing population. Indeed, the transformations of farming and agro-industry are inextricably linked, and growth of vibrant agro-industries is essential to offer employment for a large number of smallholder farmers who are unlikely to farm their way out of poverty.

Rapidly changing demands and technologies mean that agro-industries in Africa need to be nimble if they are to be competitive with producers from other regions of the world. The good news is that the policy environment and the technological tools needed to foster transformation of the agribusiness system are the most favourable they have been in over a generation. Growing external and internal demand offers potentially profitable outlets for agro-industrial products, if the problems of market access linked to high transport and transaction costs, including the costs of meeting increasingly stringent quality standards, can be overcome.

African governments and their development partners need to focus on key investments and policy changes that 'crowd in' investment by private actors and open a political space for autonomous business organizations to work to resolve the problems of horizontal and vertical coordination that currently constrain the growth of agro-industry. Adequate supply of agricultural raw materials for the agro-processing industry is critical for achieving productivity growth and competitiveness in markets where agro-industrial value chains predominate, highlighting the need to upgrade agribusiness value chains (chapter 4).

The next chapter shall examine the effects of, and opportunities for, supplying global, regional and local value chains, and shall build on the analysis for guiding upgrading of value chains.

26. For more details on VCPC, see Staatz & Ricks (2010), on which much of the discussion in the preceding paragraphs was based.

4. Upgrading value chains

Stefano Ponte

4.1. Introduction

The transformation of agricultural raw materials into industrial products or products with higher value added depends increasingly on the capacity of entrepreneurs in sub-Saharan Africa to supply global, regional and local value chains with products matching specific standards, volume and packaging requirements, at particular times, and under strict logistics and time to market demands placed by buyers. While spot transactions are still common in value chains catering for local and national consumption, over the past two decades many others have become driven by retailers and branded manufacturers/processors in developed countries, and also by regional and local actors, such as retail groups. Across the continent, new opportunities for upgrading into value added production and/or processing of agro-food and agro-industrial products have emerged, though in some value chains, actors are under pressure from competition in other developing regions of the world and from increasing demands or decreasing prices applied by retailers and processors in developed countries. This chapter examines how, where and when supplying agro-food and agro-industrial goods to global, regional and local value chains fosters upgrading in African countries.

Therefore, the key questions addressed in this chapter are: (a) What opportunities and threats does supplying products for global, regional and national value chains bring to African producers, traders and processors of agro-food products? (b) What kinds of upgrading possibilities are open to these players? (c) What kinds of strategies for adding value can be explored in specific value chains? (d) What can be done at the country-level to improve the benefits and minimize the risks of

supplying products to such value chains? (e) How could a public-private strategic decision-making framework support such improvements?

4.2. Setting the scene for upgrading

The term ‘value chain’ describes the full range of value-adding activities that firms, farmers and workers carry out to bring a product from its conception to its end use and beyond. The benefits of supplying specific value chains vary dramatically depending on how these chains are governed, whether suppliers receive inputs, knowledge and ancillary services as part of their engagement, and what end market they cater to. While supplying some global value chains can offer handsome rewards in comparison to regional or local value chains, these often come at a high cost in terms of increased risk and greater vulnerability.

Many factors determine whether a value chain is local, regional or global²⁷ but in general, what keeps a value chain local (or reverts a global to local) is a combination of:

- Traditional trade barriers (tariffs, subsidies in competing producer countries).
- Standards, which have tended to become stricter, more numerous, and ever changing in rich countries (Gibbon *et al.* 2010).
- Greater profitability vis-à-vis risks in local markets.
- The inability of local players to match volume and logistical and quality specifications demanded by international buyers.
- The emergence of competitors that squeeze out a group of players (or a country) from a value chain.

Farmers, traders and processors based in Africa are said to upgrade when they acquire new capabilities or improve existing ones. Upgrading paths (and possible combinations of paths) can be characterized as follows (Humphrey & Schmitz 2002; Ponte & Ewert 2009):

- (a) **Product upgrading:** moving into more sophisticated products with increased unit value, or with more complex content, or that match more exacting product standards.
- (b) **Process upgrading:** achieving a better transformation of inputs into outputs through the reorganization of productive activities, and/or from improving standards in quality management, environmental impact and the social conditions of production.
- (c) **Functional upgrading:** acquiring new functions that increase the skill content of activities and/or improve profitability (for example, moving from production only, to production and primary processing).
- (d) **Inter-sectoral (or inter-chain) upgrading:** applying competences acquired in one function of a chain and using them in a different sector/chain.
- (e) **Other forms of upgrading:** matching strict logistics and lead times (time to market), consistently delivering supplies reliably and homogeneously (a major challenge in agro-food products), being able to supply large volumes (thus improving economies of scale)—these can involve a combination of the upgrading types listed above.

27. In this chapter value chains focused on exports outside Africa are ‘global’, while those focused on exports to countries within Africa are ‘regional’, and all others are ‘local’, whether they cover a local region within a country, or the whole country.

There is no ideal path of upgrading—success will depend on the value chain, the strategic objective of the industry (and/or government), and the specific structure and contingent situation in a given industry. Furthermore, where the profitability of a particular function is decreasing or carrying out such a function becomes too risky, African actors could be better off moving back to simpler products, processes or functions (also known as downgrading; see examples in section 4.4).

Supplying global value chains may stimulate upgrading, technology transfer and public-private cooperation as part of the process of learning how to supply products under strict specifications, especially when exacting import standards are required. In some cases, gains are made from higher value added or more advanced technology, while in others they emanate from increased economies of scale or improved managerial capacity and logistics. Poorly designed engagement, the absence of clear strategies and external shocks can result in negative outcomes. Supplying regional or local value chains may also lead to substantial benefits and foster upgrading—usually with less exposure to risk and vulnerability, but also with less steep learning curves and more limited outcomes.

Successful upgrading in value chains depends not only on a business-friendly operating environment for private sector players, but also on specific opportunities that may be linked to a particular product or product form, to the emergence of particular technologies, to changes in international trade rules, or to the emergence of niche markets. Such windows of opportunity are often time bound: first-mover advantage is important, and abrupt changes in price and/or quality demands mean that rewards may be limited in time. Restructuring within value chains can also quickly reverse any previous gains, while advantages secured by some stakeholders may entail losses for others. This entails an industrial policy built upon a flexible system involving the private sector, industry associations, regulators and civil society actors.

Although considerable research into agro-food and agro-industrial value chains in Africa is now available, little capacity has been developed in Africa to guide industrial policy through strategic assessments of what kinds of value chains foster upgrading and/or provide more benefits to producers, traders and processors and in specific countries. Drawing on the lessons of ten case studies of agro-food and agro-industrial value chains in Africa, this chapter develops a proposal for industrial policies in African countries aimed at providing strategic direction for upgrading in value chains.

4.3. The changing role of agro-industry value chains

Engagement in different agro-food and agro-industrial value chains in Africa has resulted in uneven development pathways (Gibbon & Ponte 2005). There are cases where an increased integration into the global economy is achieved and other cases where the actors in the value chain are prone to an even greater marginalization. In line with global trends, the majority of agro-food chains in Africa have become increasingly 'buyer-driven' over the last two decades. As retail, branded manufacturing and international trading sectors become ever more concentrated in fewer hands, lead firms are increasingly able to govern value

chains—by deciding who does what, when and how, and by setting price, volume, operational and product quality requirements. The dismantling of export monopolies in producing countries and of international commodity agreements has accelerated this process.

Different kinds of lead firms govern these value chains—retailers in wine, garments or fresh fruit and vegetables, and branded processors or manufacturers in coffee and cocoa. In other value chains, such as cotton and fish, there is no clear group of firms that govern.

In buyer-driven chains, immediately upstream of lead firms (closer to the point of production), there are usually other powerful actors who do most of the day-to-day work of chain governance for lead firms, and who maintain relatively tight relationships with actors further upstream in the value chain (Gibbon & Ponte 2005). Unfortunately, there are no African lead firms in global agro-food value chains, and only a few powerful suppliers. Consequently, in many global value chains, governance is largely outside the control of Africa-based operators.

Upgrading opportunities are also shaped by downstream actors (closer to the point of consumption). This means that African producers, traders and processors, who supply global value chains do so on terms and conditions dictated primarily by developed country retailers and branded manufacturers/processors. At the same time, the global financial and economic crisis of 2007 to present (2010) illustrated starkly the extent to which reliance on global markets brings greater risks and vulnerability. A beneficial consequence of the crisis, however, was the realization that there are alternative opportunities in regional and local value chains, where entry barriers are lower, powerful firms (if any) less demanding, and standards easier to comply with. Indeed, learning and upgrading do not arise from participation in global value chains alone: regional and local value chains can offer opportunities, especially where capabilities and technological know-how are limited. At the same time, they do not necessarily provide a launch pad towards supplying global value chains due to technology traps and stringent standards. This study suggests that the outcomes of engagement in value chains, and the kind of upgrading undertaken, are not, *a priori*, better or worse in global, regional or local value chains.

The contribution of value chain analysis to shaping industrial policy

Successful upgrading in value chains depends not only on a business-friendly operating environment for private sector players but also on specific opportunities that may be linked to a particular product or product form, to the emergence of particular technologies, to changes in international trade rules, or to the emergence of niche markets. Such windows of opportunity are often time bound: first-mover advantage is important, and abrupt changes in price and/or quality demands mean that rewards may be limited in time. Restructuring within value chains can also quickly reverse any previous gains, while advantages secured by some stakeholders may entail losses for others. This entails an industrial policy built upon a flexible system involving the private sector, industry associations, regulators and civil society actors.

4.4. Ten case studies of agribusiness value chain interventions

Case study selection

Ten value chains were selected for analysis, ranging from those of a mainly global nature (fish, organics, fresh fruit and vegetables, pineapple, cotton-to-garments), to a mainly local nature (dairy, cassava), and value chains that have both global and local significance (furniture, biofuels, wine). They cover all the main categories of agro-food and fibre production and processing in Africa: high-value fresh food (fish, dairy, fresh fruit and vegetables (FFVs), pineapple) and beverages (wine), traditional export crops (coffee, cocoa), food staples (cassava), and agro-industrial products (furniture, biofuels, cotton-to-garments). Table 4.1 shows the main upgrading focus of each case study, the geographic scale of the value chain, the main processing activities that take place in African countries, and the main sources of information.

Value chain	Country Focus	Upgrading focus	Geographic scale	Key processing activities	Main origin of evidence
Fresh fish (Nile perch)	Uganda, United Republic of Tanzania	Maintain freshness, comply with food safety standards	global	filleting, chilling on ice/ freezing, packaging	Kadigi <i>et al.</i> (2007); Ponte <i>et al.</i> (2010); Ponte (2007)
Organic coffee and cocoa	Uganda	Value addition through certification	global	primary processing, curing/ grading	Bolwig <i>et al.</i> (2009); Gibbon <i>et al.</i> (2008)
Fresh fruit and vegetable	Kenya	Maintain freshness, new preparations and packaging	global	cleaning, cutting, pre-cooking, packaging and bar-coding, ready-to-cook preparations, cool storage	Dolan & Humphrey (2000); Humphrey <i>et al.</i> (2004); Dolan & Sutherland (2003); McCulloch & Ota (2002)
Fresh pineapple	Ghana	Adaptation to new varietal demand	global	grading, cool storage, some slicing and vacuum packaging	Vagneron <i>et al.</i> (2009); Fold & Gough (2008); Whitfield (2009)
Dairy	Kenya, Uganda	Improve storage conservation and distribution of fresh milk	local	cool storage, pasteurization, processing into dairy products, packaging, ultra high temperature processing (UHT), low-cost sterilization	Bennett <i>et al.</i> (2006); Meridian Institute (2009); Birachi (2006); Aliguma & Nyoro (2007); Nyoro <i>et al.</i> (2007); Mbabazi (2005)

4. Upgrading value chains

Table 4.1 continued...					
Value chain	Country Focus	Upgrading focus	Geographic scale	Key processing activities	Main origin of evidence
Cassava	Zambia	New products and processing systems, market development	local	storage for wet cassava sales; peeling, chipping, soaking/fermenting and drying; milling into flour; production of granulated roasted cassava; livestock feed; industrial starches and sweeteners	Chitundu <i>et al.</i> (2009); Meridian Institute (2009)
Furniture	South Africa, Kenya	Match buyer specifications, use different kinds of timber	global and local	sawmill operations, furniture manufacturing	Kaplinsky <i>et al.</i> (2002); Kaplinsky <i>et al.</i> (2003); Morris & Dunne (2004); Schneider (1999)
Biofuels	United Republic of Tanzania	New processing technologies, new products	global and local	production of 'straight vegetable oil' so far; future production of ethanol and biofuels	Martin <i>et al.</i> (2009); Dufey <i>et al.</i> (2007); van Eijck & Romijn (2008); Peters & Thielmann (2008)
Wine	South Africa	Value addition through branding and varietal offering, improved processes and technology	global and local	winemaking procedures, packaging, labelling	Ponte (2009); Ponte & Ewert (2009)
Cotton-to-garments	Zimbabwe, United Republic of Tanzania, Mauritius	Quality management and input provision (cotton), own brand manufacturing (garments)	global	ginning, spinning, textile manufacturing, garment manufacturing	Larsen (2008); Gibbon & Ponte (2005); Gibbon (2008)

Case Study 1: Responding to the challenges of food safety requirements in the Nile perch value chain (Uganda and the United Republic of Tanzania)

Fishery products are in high and increasing demand in international markets. Falling catches and severe pressures on several main fish stocks entail limited availability of supply, despite the recent growth of aquaculture. As a result, the value chain for wild capture fish is highly fragmented and is not clearly driven by a specific group of actors. Retailers and branded manufacturers, while setting important parameters for participation, are not as dominant as in other value chains, such as fresh fruit and vegetables and coffee. Substantial rewards are available for both processors and fishers in African countries, especially where there is no competition from the European Union (EU) and other fishing fleets.

Nile perch in Lake Victoria is one such fishery example. It is a relatively new one when it comes to exports, having started serious operations only in the early 1990s. In the 1980s, fish exports from the United Republic of Tanzania and Uganda were of a regional nature. Prior to 1991, much of the fish processing that was taking place on Lake Victoria was based in Kisumu, Kenya. The Kenyan plants were sending insulated trucks with ice to landing sites in Uganda and the United Republic of Tanzania to collect the raw material. By the late 1980s and early 1990s, some plants had sprung up in the United Republic of Tanzania and Uganda as well. In the early days, Nile perch was exported in fillet form, and sometimes as headed and gutted—all blast frozen. Hygiene certificates were needed for export, but the product and the processing plants were never really monitored. In the early 1990s, fish was first exported chilled on ice to the EU. Fish exports rose sharply between the mid-1990s and the early 2000s, except for the EU ban period of 1997-2000.

The fish quality management system currently in place in Uganda and the United Republic of Tanzania is the result of a process of upgrading that took place in the late 1990s and early 2000s in response to successive import bans placed by the EU between 1997 and 2000. In 1991, the EU promulgated the European Commission (EC) Regulation 91/493 on the “Production and placing on the market of fishery products for human consumption”. This regulation required the introduction of systems of inspection and control to ensure human consumption safety both in EU countries and in countries willing to export to the EU. These measures included compliance with “good hygiene practices” (GHP), “good manufacturing practices” (GMP) and the application of Hazard Analysis and Critical Control Point (HACCP) procedures. In addition, competent authorities in third countries needed to demonstrate adequate control.

The EU has now integrated these regulations in the so-called “hygiene package” that went into force in 2006. Its main features are:

- a) Third countries need to have health and sanitary regulations that are at least equivalent to the ones required within the EU.
- b) They need to have competent authorities that can guarantee effective implementation of the relevant regulations through inspection, monitoring, and sanctioning systems.

c) Business operators need to apply specific sanitary and health practices in catching, handling, processing, and packaging fish and fishery products, and a system of risk management based on HACCP.

In the early days of Nile perch exports, and even after the promulgation of EU regulation on fish safety in 1991, East African processing plants did not have operational HACCP plans in place. In the period preceding the ‘mad cow disease’ scare, the EU was not as strict on enforcing food safety standards, and a phase-in period had been granted to third countries. There was no organized system of inspections by the competent authority. The first import ban in East Africa took place in 1997 as a result of reported instances of high bacterial contamination, including salmonella, in some Nile perch exports from Lake Victoria to Spain and Italy. The ban was limited to these two countries. The second ban was imposed for seven months in 1997/98 as a result of an outbreak of cholera in the three riparian countries and Mozambique. On this occasion, the EU banned the import of fresh fish and imposed mandatory tests on frozen fish from East Africa. This was eventually lifted because it was not based on scientific evidence, but on the EU claiming that the competent authorities were not applying sufficient measures to control the outbreak of cholera.

The third ban of 2000 (which lasted four months), was initially a self-imposed export ban by Uganda. It started in response to local press reports on the death of a Ugandan child from fish poisoning. Poisoning was linked to the alleged practice of fishing by dumping pesticide in the lake. The Uganda competent authority, at that time, the Uganda National Bureau of Standards (UNBS), declared that it could not guarantee the safety of fish exports and pleaded with the EU for time to solve the problem. The EU, however, immediately applied its own import ban and extended it to Kenya and the United Republic of Tanzania as well—even though the allegations were never proven. Successive missions carried out by the EU to assess the state of health control and monitoring in the riparian countries identified a number of problems in the regulatory system that was in place at that time (Ponte 2007).

Responses to these challenges

The EU import bans had wide-ranging effects. In addition to reduced fish exports and loss of export revenue, negative repercussions were felt in fishing communities, among fish processors and related service industries (packaging, transport, etc.). As a result of the bans, several plants closed down completely, and the rest worked at much lower capacity. At the same time, the bans and the feedback provided by the EU missions led to the streamlining of the regulatory and inspection systems, a revision of food safety procedures and guide lines, and of monitoring and inspection systems. At the factory level, assistance was provided for the implementation of HACCP and quality management systems. Several sites were upgraded to handle fish for export, with donor support. An internationally accredited private laboratory was established in Uganda, thus avoiding the shipment of samples for testing to Europe. Finally, regional efforts started for the harmonization of handling procedures in the countries sharing Lake Victoria.

This came at a cost for the industry, as it had to comply with new food safety requirements. HACCP, GMP and GHP compliance necessitated changes in the layout

of plants, the establishment of new procedures, training of personnel, and forming of quality control teams. However, it is generally agreed that the bans provided the stimulus for an important process of further upgrading in the industry.

The ban was finally lifted in 2000 following the establishment of developed standard operating procedures by the competent authorities, having achieved more transparency, and installing document control systems. This was done in close collaboration with the industry, especially in Uganda and the United Republic of Tanzania. Later that year, the United Republic of Tanzania was placed back on the EU list that allows imports from a third country without special permission, followed by Uganda in 2001.

The next round of EU inspections took place only in 2006. These highlighted the need for fine-tuning of regulations and standard operating procedures; the lack of upstream food safety procedure controls on the lake (Uganda); and the need for landings for export to take place only at approved sites (United Republic of Tanzania). The current level of areal traceability (to the group of islands where the transport boat has operated in a fishing trip) is believed to be sufficient. In comparison to the previous inspections, the issues raised are of less immediate concern and gravity, although they may create problems if unaddressed. Of particular concern is the issue of icing and handling on fishing boats and the quality of ice holds on transport boats. Given that the fishing takes place at night and catches are usually collected by the collector boat after a few hours, the first hours after the fish is caught do not have a major impact on freshness. This, in any case, could be solved in fairly inexpensive ways (by carrying washable crates on the fishing boat).

But despite these concerns, it seems that the East African Nile perch industry has to a large extent 'solved' the issue of food safety and compliance with EU import standards and procedures. The main burning issue to maintain livelihoods around the lake is now the sustainable management of the stock, where improvements have been far less satisfactory. Strong demand and healthy export prices militate against discussions of how to limit the amount of fish extracted from the lake. But changes in demand specifications (a fall in demand for smaller fillets) are now providing new incentives to take sustainable fishery management more seriously in the region, together with signs that stocks may have reached a critically low point.

The future of the industry: sustainability, stocks and fishery management

The high rate of growth of fish exports from Lake Victoria from the late 1980s has been accompanied by a number of concerns regarding the environmental sustainability of the resource base. These concerns relate to: (a) overfishing and resource depletion; (b) loss of biodiversity with the introduction of exotic species; (c) effluent pollution from fish processing and other industries; (d) degradation of shoreline ecosystems; and (e) resource mismanagement due to different environmental standards in the riparian states.

In the last few years, a recovery in biodiversity and a decrease of hyacinth presence along the coastline has meant that most of the sustainability discussion has centred on how to avoid resource depletion and on the effective implementation of now regionally-harmonized fishery management standards. The urgency of the situ-

ation has been underlined in a recent study assessing biological changes in the fish stock in Lake Victoria, suggesting that “Nile perch stocks are under pressure and the fishery may have reached, or even exceeded, its limit” (Lake Victoria Fisheries Organization 2007). This means that current fishery management is failing to address sustainability issues and that the gains achieved from upgrading in the industry are under threat.

Many rules have been enacted around the lake aiming at regulating fishing. However, until recently they were implemented through sporadic but hard-hitting methods, such as occasional busts and military-style operations involving the sequestration and public destruction of illegal gear. On-water patrolling was almost non-existent, and bans on trading of under-size fish were almost never implemented. But two recent developments are changing this picture. First, the implementation, starting in late 2007, of a self-monitoring system on minimum fish size by export processing plants; and second, the establishment of Beach Management Units around the lake.

Since late 2007, a self-monitoring system geared towards banning the processing of under-size fish has been operational in Uganda and the United Republic of Tanzania. While Kenya has formally agreed to join the system, the troubles that affected the country in late 2007 and early 2008 have delayed its effective implementation. The process was initiated by the Uganda Fish Processors & Exporters Association (UFPEA) in September 2007, following a series of meetings amongst members including an extraordinary meeting held to make resolutions on the matter. The same system was adopted in the United Republic of Tanzania in October 2007.

Essentially, the industry association in Uganda started by setting up a team of independent inspectors, funded by the industry itself, which monitors the size of fish used in the members’ processing plants (all plants are members of the association). Sanctions are applied by the competent authority, not by the private teams of inspectors, under a memorandum of understanding between the industry association and the relevant fishery authority. The first instance of non-compliance (with a 3-5 per cent tolerance level depending on the country) attracts a one-week closure of the plant; the second instance a one-month ban; and the third instance a three-month ban.

In Uganda (as of February 2008), there have been only a few instances of a first non-compliance; in Tanzania plant closures took place in four places, one of them for a second time (as of May 2008). Kenya has not yet started implementing the self-monitoring system effectively. A cynical view of such a development would suggest that ways have been found around the inspections at the plant level; however, participant observation and interviews at landing sites and with processors suggest that undersized fish are not being landed in any significant quantity. From this point of view, the initiative can be seen as a success.

However, that undersized fish are not going to be accepted at export processing plants in Tanzania and Uganda does not mean that such fish are not being caught. Press reports and direct observation of fishing activities on the lake suggest that undersized fish are off-loaded in other sites and finds their way into local and

regional markets (especially the Democratic Republic of Congo (DRC) and Sudan), but at lower prices than fish exported to EU markets. This means not only that the resource is still likely to be over-exploited, but also that the positive impact on the local economies of Uganda and the United Republic of Tanzania has decreased. In border areas, there are also strong indications that undersized fish are arriving in Kenya (where the self-monitoring ban is not effective), from where they are exported through legal export channels (Ponte *et al.* 2010).

But stopping undersized fish from being extracted from the lake is a much more complicated issue, which relates to the gear used in the Nile perch fishery, the cost and the incentives of using alternative gear, and the type of fishery management and monitoring models that are more likely to promote change in the direction of sustainability. It also involves effectively monitoring the local and regional fish trade.

Lessons:

- 1) The challenges posed by stricter food safety regulation in the EU led to upgrading processing plants and quality management along the value chain from landing to export.
- 2) Without private-public cooperation and a strong industry association, these challenges would not have been solved.
- 3) The success of the industry may be sowing the seeds of its demise: fish stocks and catches are at very low levels and threaten the sustainability of the industry – a spate of fresh private-public initiatives is trying to address fishery management on the lake.

Case Study 2: Upgrading through smallholder-friendly value addition with organic certification of coffee and cocoa (Uganda)²⁸

Over the last fifteen years, the market for certified organic agricultural products has grown rapidly. In Europe for example, organic sales in 2007 were worth \$21.6 billion or 2.5 per cent of all food sales by value. Rising demand both for organic tropical products and for year-round supply of some organic temperate products has encouraged organic activists, NGOs and some donors to promote certified organic export production in a number of African countries.

For many of these products, African operators were already participants in their respective non-organic value chains. Entering the organic variant of these value chains, however, required certification and (sometimes) changes in farming practices. In value chain analysis, this is an instance of upgrading within an existing value chain; such upgrading takes place by including new product qualities (organic) and changing the processes that give birth to such qualities. In other words, both product and process upgrading takes place.

Fortunately, in organic value chains African producers can still expect to be paid premia over an equivalent product for such qualities—this is not necessarily the case, for example, in other ‘sustainability’ certifications (such as Rainforest Alliance bananas, Utz-certified coffee, Marine Stewardship Council-certified fish, etc).

28. This case study is based on Bolwig *et al.* (2009) and Gibbon *et al.* (2008)

However, a higher price for the product sold in such value chains does not necessarily entail a higher net profit, due to the possible impact of higher labour costs and lower yields.

Uganda is one of the two leading exporters of certified organic produce by value in tropical Africa (the other being Kenya). It was an early entrant in organic value chains, thanks to an active local organic movement and support from donors. In 2006, there were between 20 and 25 certified organic exporters, while total organic exports were worth just under \$7 million annually. Organic exports were dominated by the traditional cash crops, led by coffee, and were overwhelmingly targeted to the European market. With a few exceptions, all organic export operations were organized as contract farming schemes. Most such schemes were supported to different degrees by one or more donors, with only limited or no facilitation role by the state.

A recent series of studies carried out by a team of researchers from the Danish Institute for International Studies (DIIS) compared organic and conventional farming systems for coffee and cocoa in Uganda (Bolwig *et al.* 2009; Gibbon *et al.* 2008). In both cases, net revenue has been shown to increase significantly (by 100 per cent in the case of coffee, 82 per cent in the case of cocoa) as a result of organic certification (the impact of organic practices *per se* is more modest). These case studies show that organic agriculture has had a positive impact on the livelihoods of participating households. Therefore, not only organic certification provides value added to farmers, it also increases net incomes and allows smallholders to maintain their market access.

A related and policy-relevant issue is whether such impacts are linked to contract farming as such. This is because many of the certified organic schemes in Africa are based on contract farming organized around commercial farms and/or large-scale exporters. The current policy and academic interest in contract farming arises from a concern that African smallholders are becoming excluded from more remunerative value chains, whether these are for agricultural exports or for higher-value products sold on domestic markets. Such a trend is thought to have generated from declining public investment in infrastructure and extension, as well as of private market failure in respect of inputs and sometimes also output. Contract farming is seen as a solution to such problems, since it increases economies of scale and thereby reduces private traders' transaction costs. On the other hand, a number of reservations concerning the benefits of smallholder contract farming arrangements have also been aired, challenging whether contract farming schemes generate sustainable income benefits for participants.

The DIIS studies show that certified organic contract farming schemes can be demonstrated to have positive revenue effects for smallholders, a question pertinent to the evaluation of both organic agriculture and contract farming as possible routes out of Africa's well-advertised problem of agricultural stagnation and decline. In doing so, they took into account the problem of non-random selection into the scheme. This entails controlling for the possibility that any observed positive revenue differences between participants and non-participants will reflect differences in farmers' factor endowments or abilities, rather than the unique impact of

participation itself. In the rest of this section, attention is paid particularly to one of these schemes—the Kawacom Sipi organic Arabica coffee scheme (hereafter, the Sipi organic scheme).

The Sipi organic scheme

Coffee is central to Uganda's rural economy, with an estimated 350,000 smallholder producers. Coffee also has been Uganda's single most important export good since the late 1960s. Uganda produces Robusta and Mild Arabica coffees, and a little Hard Arabica, with Arabica accounting for about 20 per cent of coffee exports. Quality is a key competitive factor in the international market for Mild Arabica. The most important coffee bean quality attributes are physical defects and cup defects (undesired taste characteristics), which are affected mainly by processing and handling. The quality of Ugandan coffee deteriorated rapidly in the first few years after liberalization in the early 1990s as exporters rushed to establish market share through aggressive procurement practices, *inter alia* through buying unripe or poorly processed beans. Similar practices were observed in the 2005 and 2006 seasons, when rising export prices following a period of production decline caused a new scramble for coffee.

Since the late 1990s, some Ugandan exporters have tried alternative models of coffee procurement to the predominant open market one that relies on several layers of middlemen. The resulting schemes often involve certification to various sustainability standards (organic, Utz Kapeh, Fair Trade and proprietary), as well as allowing other forms of product differentiation such as bean quality and geographical origin. The central motive for their establishment was to protect trading margins during the coffee crisis. A facilitating factor has been the availability of donor support. The schemes often resemble contract farming in their design, although with sometimes low levels of commitment on the part of both buyer and farmers. One of the earliest and largest is the Kawacom Sipi Organic Arabica scheme.

The Sipi scheme is operated by Kawacom (Uganda) Ltd, a subsidiary of the international commodity trading house Ecom Agroindustrial Corporation. Kawacom is one of the largest exporters of conventional coffee from Uganda and the biggest exporter of organic coffee. The scheme is situated on the northern slopes of Mount Elgon in Kapchorwa District in eastern Uganda. The project included 3,870 organic farmers in 2005, most of whom were registered and certified in 2000/01. Registration is free for farmers, and as a result 62 per cent of all households in the area are registered. Organic certification is to both the EU and US standards and is paid for by Kawacom. A group certification system is used, based on an elaborate internal control system (ICS). The central component of the ICS is an annual or semi-annual farm inspection performed by locally-recruited company field officers. The field officers give technical advice during the farm inspections and monitor the performance of each farmer in terms of his/her compliance to the organic standards and other project requirements.

Project farmers are required to follow certain production and on-farm processing practices, most of which are specified in a contract issued to each farmer by Kawacom at the time of registration. The practices are those necessary to conform

to organic standards and others known to improve the physical quality of coffee beans in terms of size, moisture content, appearance and aroma. In addition, the technical advice disseminated emphasizes farm practices—mainly but not exclusively organic—that should enhance yield per area unit.

The coffee is purchased by Kawacom at designated collection points and stored for later transportation to a factory in Kampala, where it is further processed and graded for export. The farmer is paid cash on delivery. Kawacom buys all the coffee offered for sale by its organic farmers during the main buying season, irrespective of the size of its organic orders. Any surplus is sold as conventional. Prices are communicated daily by mobile phone through the network of field staff and contact farmers. The contract obliges Kawacom to pay an organic premium if the coffee is 'of suitable quality'. The size of the premium is not specified, and there has been no direct price negotiation between Kawacom and the farmers. In 2005 Kawacom paid a price premium of about Uganda shillings UGS 300, or 15 per cent above the prevailing price in the Mount Elgon area. This premium reflected both an organic premium realized at the export level, the higher quality of organic coffee, and price competition from other traders operating in the scheme area.

In summary, Kawacom employs various means to enable and induce growers to comply with its organic and quality standards: regular farm inspections, group training and individual advice, input provision (on a very limited scale), a policy of rejection of sub-standard and suspected off-scheme coffee, a price premium, and a procedure for deregistering farmers who consistently or grossly violate project standards and rules.

Lessons:

- 1) First-mover advantage is important in establishing the credentials of a country in new value chains, or in value chains where product definition is changing.
- 2) Such first-mover advantage can be built without waiting for governments to line up their (slow) support; targeted donor support can make a difference.
- 3) Certified organic farmers in coffee and cocoa in Uganda display higher profitability than comparable non-organic farmers, even when factor endowments and self-selection bias are controlled for; higher profitability for certified organic farmers than for non-certified ones is dependent on the organization of certified organic production in contract farming schemes.
- 4) It is the specific design features, rather than contract farming in general, that can generate upgrading that is also improves welfare among smallholders.

Case Study 3: The complex impact of value chain participation and upgrading in fresh fruit and vegetables industry (Kenya)

The fresh fruit and vegetable (FFV) value chain linking Kenya to Europe (and especially the UK) is probably the most thoroughly analysed value chain in the Africanist literature. As a result, it is also where the assessment of value chain upgrading is more advanced. The Kenyan horticulture industry is widely considered a success story—having set up advanced farming and processing infrastructure, excellent logistical support and having generated substantial opportunities for employment

in processing factories and income growth among producers. This brief exposition of its development and its outcomes seeks to highlight the conditions that made it such a success and the sources of possible vulnerabilities.

Exports of horticultural products have witnessed strong growth in the last two decades. Imports of vegetables into the EU increased dramatically in the 1990s. A large majority of these imports come from Africa, with Kenya representing almost half of all exports from the continent to the EU by 1999. While up to the 1980s much of these exports were in the form of 'Asian vegetables' and were destined to wholesale markets, by the late 1990s Kenya was supplying some 75 horticultural products, not only in raw form, but also in pre-packed and pre-cooked forms—a large majority of these are now purchased by a small number of food retailer chains. While the production of vegetables for export was initially carried out by smallholders, by the late 1990s, around 40 per cent of export products were sourced from large commercial farms and/or in farms owned by exporters due to increasingly tight quality and food safety demands (Dolan & Humphrey 2000; Gibbon & Ponte 2005).

In order to match these demands, and because of the perishable nature of fresh vegetables, the Kenyan FFV industry had to upgrade its processing abilities substantially, including in post-harvest facilities, transport infrastructure and in advanced managerial and marketing skills. It has also developed improved packaging forms, expanded its product ranges, and matched an increasing number of standards, labels and codes (such as GlobalGAP and the Ethical Trade Initiative (ETI)). This happened by and large without government intervention and/or facilitation (some even argue that it happened because of lack of government intervention).

The impact of upgrading

A series of studies on Kenyan export horticulture (Dolan & Humphrey 2000; Dolan & Sutherland 2003; Humphrey *et al.* 2004; McCulloch & Ota 2002) provide a precise picture of the impact of upgrading in this value chain on rural and urban households. From the summary results, it has been shown that regarding employment, at the production level, a shift has taken place from smallholder production to wage employment on large-scale farms—it is not clear what the overall balance is in terms of employment numbers. Further, many of the workers in commercial farms are landless women who may have few opportunities for earning an income otherwise. At the processing level, there has been increased employment in processing plants in urban areas, mostly of young, single women and of workers coming from relatively low-income households. Common to both production and processing, there is some improvement in employment terms as a result of the application of the ETI code; greater attention to worker's health, especially in relation to pesticide handling and application; new employment mostly for unskilled labour; and some benefits to both casual and permanent employees (food, transport, medical care, sometimes housing). Other benefits are only provided to permanent employees (pension, maternal and annual leave, sickness).

There have also been impacts on incomes and livelihoods, with households involved in export horticulture are better off than households that are not, both in

rural and urban areas. In rural areas, smallholders supplying larger farms on contract benefit from higher incomes and from access to credit and extension services provided by exporters, while non-horticultural smallholders are much worse off. However, it is not clear whether higher incomes of horticultural households are a result of their participation in the value chain or whether their participation is the result of being better off to begin with, and there remain substantial hurdles to entering the horticultural sector for smallholder households. In urban areas, meanwhile, the median per adult equivalent income of households with individuals working in processing plants is higher than that of households not involved in the sector. Although earnings tend to fluctuate, due to the seasonality of the demand for labour and the prevalence of casual employment, food poverty decreases as households switch from non-processing work, to work in processing plants.

Vulnerability factors for the sector include the high dependence of most employees on their income from horticulture employment, especially among processing plant workers, combined with insecurity of employment, which is mostly casual, especially among women. Further, there is little opportunity for promotion and skill upgrading; working hours are variable depending on season and demand, and the status of smallholder farmers who have been ejected from the value chain remains unclear.

Lessons:

- 1) Value chain upgrading in the FFV industry led to a differentiated impact on various stakeholders—but with net welfare and employment effects, although with increased risks and vulnerability.
- 2) Downward price pressure and logistics and quality challenges have provided the stimulus for setting up more efficient production and packing systems for better quality products.
- 3) At the same time, this has been translated into increased casualization of labour; yet, such jobs are of higher quality than those available in the same areas for the same level of skills.
- 4) Such upgrading was stimulated mainly via ‘learning from global buyers’, rather than from national extension and agricultural research systems or from locally generated technological innovation.
- 5) Government played little or no role in such process.

Case Study 4: Responding to new consumer preferences through the fresh pineapple value chain (Ghana)

Pineapple production and export have grown dramatically in the last few decades. From 1960 to 2005, global production quadrupled from 4 to 16 million tons (Vagneron, *et al.*, 2009, p.437). Pineapples can be exported in fresh form or processed. The fresh pineapple market represented 26 per cent of the total market in 2005 by volume, and imports in both the EU and US more than doubled between 1999 and 2007 (*ibid.*). Costa Rican exports to the US increased quickly from the mid-1990s onwards, but up to the late 1990s, imports into the EU were dominated by Cote d’Ivoire. In the past decade, Costa Rica met much of demand growth in

Europe, while Ivorian exports declined and Ghana's increased (Fold & Gough 2008).

Much of the change in these trade patterns is related to the actions of a small number of multinational corporations (MNCs) that are involved in production and branded marketing, and especially Fresh Del Monte Produce. In 1993, Del Monte obtained a patent on a pineapple variety named CO-2, later renamed MD2. It expanded production of this variety in Costa Rica and started marketing it in the US under the name 'gold extra sweet' (ibid.). When the patent expired in 2003, other major fruit companies also started producing MD2 and marketing it aggressively in the US. Once the US market became saturated, they targeted the EU market. MD2's taste is sweeter than Smooth Cayenne (the traditional variety exported from West Africa), its colour is more golden, it is smaller (making it ideal for a family meal without leftovers), and it is more rounded (yielding slices of similar size). It also has longer shelf-life.

The pineapple value chain is a highly-driven chain controlled by MNC producers and to a lesser extent by retailers. MNC producers exercise a high level of control along almost the entire value chain: (a) they have defined product quality through varietal innovation; (b) they control production through the establishment of own commercial farms; (c) they can take advantage of their experience in the banana sector in the field of logistics and transportation to control quality and timing of delivery; and (d) they market their pineapples under a brand name, supported by expensive marketing campaigns (Vagneron et al. 2009, p.442).

Restructuring of Ghana's pineapple sector

The development of the fresh pineapple industry in Ghana was, until recently, a success story. The first exports started in the late 1970s and picked up substantially from the mid-1980s. In 1996, exports were still under 20,000 tons, shooting up to over 70,000 tons in 2004 (Whitfield 2009). In contrast with other exporting countries, production was carried out mainly in small and medium-scale farms, and the industry had a large number of exporters (over 50 in the early 2000s), of which many were Ghanaian-owned (Vagneron *et al.* 2009, p.442). One of these exporters (Farmapine; second largest exporter in 2002) was based on a farmer-ownership model financed through a World Bank project. Such an industry structure had positive impacts on poverty reduction in the country but, at the same time, quality and output were less consistent than in countries where the industry is based on large-scale farms.

By the early 2000s, European demand for Smooth Cayenne, the variety for export originally grown in Ghana, had started to decline. Larger local producers gradually started to switch to MD2 and foreign investors began to set up large-scale farms for its cultivation. By 2005, demand for Smooth Cayenne had all but disappeared, and by 2007 exports were 30 per cent lower than at their 2004 peak. They would have been even lower had Golden Exotics, a subsidiary of a fruit MNC, not been established. In 2007, Golden Exotics accounted for 40 per cent of Ghana's fresh pineapple exports. As of 2009, the industry consists only of large-scale producer-exporters; even pure exporters have almost disappeared (Jaeger 2008;

Whitfield 2009). Because MD2 requires fast refrigeration after harvest, commercial companies are reluctant to consider buying MD2 pineapples from smallholders. MD2's value is in its higher sugar content, which is available before full ripeness.

In a way, the pineapple industry in Ghana has upgraded. It is providing the right variety to the market with more reliable volumes and quality, and most likely obtains unit prices that are higher than before its restructuring. All exports are now GlobalGAP certified (Jaeger 2008). Large-scale farms have also provided important employment opportunities, and there are now seven companies processing fruit for export, with more operating for the local market (Whitfield 2009). At the same time, in some areas, smallholders have stopped cultivating pineapple altogether (Fold & Gough 2008). As of 2009, only one of the surviving farmer-exporters sourced from out growers, and procured only small amounts of MD2 from them (Whitfield 2009). It is unlikely that employment in these farms and in processing plants has reached a size that fully compensates the loss of market access for smallholder farmers.

Smallholder alternatives

Several initiatives have been undertaken in Ghana in reaction to the restructuring of the pineapple value chain chronicled above. All seek to find alternative markets for their product, or to help them transitioning to the new variety that is demanded in the EU market. One of these alternatives has been seeking access to the fair trade market. Farmapine, a company co-owned by farmer cooperatives, obtained fair trade certification in 2004 and started exporting modest quantities to Tesco, with plans for expansion. By 2007, however, Farmapine had ceased to operate as a result of over-investment, delayed input supplies and delayed payment to farmers. As of late 2007, other initiatives had started seeking exports to the fair trade market. But these are based on large-scale commercial farms that plan to use a proportion of the fair trade premium to support local schools, water supply and electricity (Fold & Gough 2008).

A second alternative relates to the export of freshly cut and vacuum packed pineapple slices, a business run by a UK company. This plant was established in 1999 and supplies some of the main UK supermarkets. When demand in Europe switched to MD2, the company established its own farm, but subsequently discovered that its customers actually preferred Smooth Cayenne pineapple slices. While in this case smallholder production continues, the story highlights how vulnerable they are to changes in consumer demand (Fold & Gough 2008). Also, pineapple juice production is increasing (mostly for the domestic market), and Smooth Cayenne yields a higher proportion of juice than MD2.

A third alternative is one that entails reverting to a pineapple variety that was dominant in Ghana before the export industry was established—Sugarloaf. While popular in local markets, until recently this variety was not considered saleable in Europe, due to its greener colour, longer and cone-like shape and pale white flesh; however, it is now attracting interest there too. As a result of efforts by donors, retailers and research institutions, an organizational structure for the processing of this variety has been implemented. It has also obtained organic certification, an easier

feat than for MD2 since it has been traditionally cultivated without costly inputs and harvested when naturally ripe. Sugar Loaf pineapple is now sold in upper-end supermarkets in the UK, after a process of slicing, packaging in plastic tubs, chilling and transport via air-freight (Fold & Gough 2008).

A fourth and final alternative has been a donor-led initiative to help smallholders enter the MD2 value chain. Such a project is distributing MD2 plantlets to smallholders and aims at training farmers and establishing a producer marketing organization to obtain GlobalGAP certification. According to (Jaeger 2008), the roll-out of MD2 has been accomplished, and plantlets are available at a manageable cost.

Lessons:

- 1) Smallholder farmers are highly vulnerable to changing consumer preferences.
- 2) Consumer preferences can be shaped effectively by producer MNCs through product innovation and branded marketing.
- 3) Niche marketing can provide some solutions in response to varietal innovation that excludes smallholders, but is unlikely to stem the overall tide.
- 4) Donor support is often required to help smallholders adapt to new situations or to promote organizational mechanisms that can help them to re-enter a value chain.

Case Study 5: Back to basics with upgrading in raw and processed milk value chains (Kenya and Uganda)

Globally, the demand for milk and dairy products keeps rising, as a result of increasing incomes and urbanization. Smallholder dairy production has been shown to provide increased food security and poverty reduction (Wouters & van der Lee n.d.). Dairy industries in developing countries are usually structured along two parallel value chains: (a) one for fresh raw milk, consumed locally or marketed without pasteurization (referred to as 'raw milk' thereafter); and (b) the one for processed milk and other dairy products (referred to as 'processed milk' thereafter).

Increasing urban demand is stimulating the development of processed milk value chains, where quality management plays a more prominent role. The development of such value chains often results in scaling up in the dairy industry leading to a more concentrated sector. While this may lead to more milk being sourced from larger-scale operations, the smallholder sector is likely to maintain an important role (*ibid.*). This is because, in most developing countries, raw milk value chains are by far the most important, ranging from 83 per cent of the total market in India to 98 per cent in the United Republic of Tanzania (Bennett *et al.* 2006, p.2).

Kenya is the largest producer of milk in sub-Saharan Africa, and dairy is the largest agricultural subsector in the country (Staal *et al.* 2008). The country has an estimated 3.2 million dairy cattle, and milk production increased from 1 million tons in 1980 to 2.8 million in 2002 (Birachi 2006, p.13). Kenya has a large and sophisticated system of cooperatives that provide milk to a small number of large-scale processors. Yet, 85-90 per cent of milk production is still marketed in raw form due to traditional preferences for fresh raw milk and unwillingness to pay the extra

costs of processing and packaging (Meridian Institute 2009). Uganda has a much smaller dairy industry, where 70 per cent of its milk is consumed in raw form (Aliguma & Nyoro 2007). After fast growth in UHT milk processing production during the 1990s, especially in the west of the country, most factories subsequently closed down due to problems in managing raw milk supplies and because they had acquired loans in dollars before the depreciation of the Ugandan shilling (Mbabazi 2005).

In both countries, the majority of milk is consumed or sold by producers directly to local consumers; other channels of distribution are through milk bars, shops, kiosks and mobile traders. In Kenya, the formal market is constituted by deliveries to dairy cooperatives or farmer groups and by direct deliveries to a few large-scale dairy processors based in main urban centers (Bennett *et al.* 2006; Nyoro *et al.* 2007). In Uganda, eight large-scale processing companies are located in the Western region of the country, where there is an excess supply of milk. A number of micro-processors have also entered the market—several are located in Kampala. The processing industry in Uganda mostly supplies pasteurized milk, while in Kenya it is much more diversified. Uganda imports much of its processed dairy products from Kenya and South Africa.

Alternative paths for upgrading

In the past, much attention has been paid to upgrading the processed milk value chain in Kenya, Uganda and elsewhere. This stems from the widely-held belief that upgrading needs to take the form either of the provision of safer products and/or value addition in the form of more advanced processing, development of new products for the local market (yoghurt, cheese, etc.) and institutional improvements, especially in relation to dairy cooperatives. Such an approach focused on one or more of the following: (a) improving animal health and prevention of diseases; (b) improvement in milk testing and related systems of quality management; (c) improvement in processing technologies and innovation in product development; and (d) improvements in the organizational structures of dairy cooperatives.

However, empirical evidence suggests that demand for traditional products is not likely to change with increased levels of income, at least in Kenya (Staal *et al.* 2008). As a result, some analysts are now challenging upgrading focused on the formal market and suggesting instead concentrating on the needs of local producers and consumers. While cooperatives have played an important role in dairy development in Kenya (though not in Uganda), they are primarily tied to the demand for processed products, and thus face the same growth limitations (*ibid.*).

Upgrading in the context of local markets

An alternative to the path highlighted above takes into consideration the preferences of local consumers and the constraints under which small-scale producers operate. A lack of low cost and accessible sterilization technologies means that the rate of spoilage in the informal strand of the value chain is high. It also means that the distance the milk can travel is restricted, which results in suboptimal prices for producers. Furthermore, boiling milk before consumption significantly decreases its

nutritional value. Therefore, one option that is being considered is to develop sanitation and transportation techniques that do not significantly add to the final consumer price, such as portable ultraviolet sterilization devices, inexpensive and accessible cooling centres, and low-cost sanitary milk packaging (Meridian Institute 2009).

Lessons:

- 1) Too much attention has been paid to the development and upgrading in the value chain for processed milk and dairy products in both Kenya and Uganda.
- 2) Very limited efforts so far have been directed to improvements in the raw milk value chain, which covers up to 80 per cent of total milk production in the two countries.
- 3) There is a pressing need to find low-cost solutions to sanitation, storing and transportation in the informal strand.

Case Study 6: Potential and pitfalls of upgrading in local cassava value chains (Zambia)

Cassava is one of the most important food security crops in Africa, due to its resistance to droughts and disease, tolerance of soils that are not very fertile and flexible planting and harvesting cycle. It is the world's fourth most important staple crop after rice, wheat and maize. In addition to food security, it is also used as animal feed and has a variety of possible industrial uses. Once matured, cassava can remain in the ground for up to 12 to 18 months. However, when harvested, it needs to be processed within two to four days. It also needs to be processed properly, as it contains cyanogenic compounds that are potentially hazardous to human health (Meridian Institute 2009). The usual practice in East Africa is to dry-ferment it—after uprooting, it is peeled, washed and dried for two to three days, after which it is covered for another two to three days; moulds are then removed and cassava is pounded in pieces and dried again.

Africa is the world's largest producer of cassava, with a market share of about 50 per cent. In West Africa, production is highly commercialized, and cassava is used mostly in processed forms. Nigeria is the single largest producer on the continent (approximately 70 per cent of Africa's production) as well as globally. In East Africa, cassava is mostly consumed in raw form (cooked fresh roots). As fresh cassava has a low value/bulk ratio and is perishable, it is marketed at a very local level.

Upgrading possibilities

A number of possible improvements could be applied to domestic cassava value chains:

- a) Raw cassava storage: spraying cassava roots with fungicide and storing them in plastic bags can increase their shelf life up to two to three weeks (Westby, 2008), therefore increasing the distance which they can travel to be marketed.
- b) The bulk of cassava can be decreased dramatically by processing it into flour or granulated roasted cassava; this involves peeling (the most labour-intensive oper-

- ation), chipping, soaking/fermenting and drying—all these can be done at the farm level and represent value addition.
- c) Production of high-quality cassava flour (HQCF) to be mixed in bread, pastry and other food preparations—this involves the milling industry.
 - d) Production of livestock feed.
 - e) Industrial uses (industrial starches and sweeteners).

The Zambian experience

Cassava production has grown rapidly in Zambia following the introduction of high-yield varieties in the 1990s and 2000s, especially in the north of the country where it is the main food staple. Farmers can harvest it during the lean season (December to February) when incomes are low. While hybrid maize requires the purchase of new seeds and fertilizer each season, cassava farmers can replant their own cuttings (Chitundu *et al.* 2009, pp.598-599).

The marketing of cassava in Zambia is carried out in five different ways: (1) subsistence production/consumption, accounting for 90 per cent of the total; (2) local purchases of fresh cassava from other households or traders, within a 50 km radius (5 per cent of total production); the remaining three methods account for the remaining 5 per cent of production; (3) dried chip production and processing into flour for domestic consumption; (4) production for livestock feed companies; and (5) production for industrial users (Chitundu *et al.* 2009, pp.598-599).

Recognizing the potential of cassava to improve food security, especially in drought-prone areas, led a coalition of NGOs to distribute cassava cuttings, while the private sector started to develop cassava-based products on a small scale. The commercial potential of cassava was later recognized by the Agricultural Consultative Forum, which in 2005 organized a special session on cassava, leading to the formation of the Acceleration of Cassava Utilization (ACU) Task Force. Previous interventions in the cassava value chain were mostly focused on improving productivity. But as households become food secure, increased production yields generated surpluses that were difficult to sell in fresh form. As a result, the ACU prioritized the value chain strand for livestock and for flour-based preparations. There is also long-term potential for industrial uses (including bioethanol) (Chitundu *et al.* 2009).

Livestock feed trials begun in November 2006, and the results suggested that cassava-based feed would be commercially viable as long as chips could be bought from mills at 60 per cent of the price of maize. Consequently, one feed producer started to buy cassava and has piloted the production of cassava-based feed. As for processed foods, an initiative started to blend cassava flour in 'nshima' (the Zambian staple), and a study was conducted on consumption preferences, which suggested that blending of cassava with wheat bread flour would be acceptable up to about 1 to 15 per cent of the total. A large cassava mill has now been established in Mansa. On the industrial side, Zambia's main brewery became interested in developing a cassava-based malt beer, following a similar and successful experience in Uganda. The development of artificial sweeteners was also explored. On the downside, the government has recently stopped cassava procurement for food safety, and maize

subsidies have crept back, making cassava less attractive (Chitundu *et al.* 2009; author's personal communication with Steven Haggblade).

Lessons:

- 1) Cassava is an important component of food security in Africa, especially in drought-prone areas; however, market expansion of fresh cassava is limited by its perishability once harvested.
- 2) Technically-speaking, there are plenty of opportunities to upgrade cassava products and related processes; there are also opportunities to diversify final consumption away from fresh cassava and towards processed food, livestock feed and industrial uses.
- 3) In Zambia, a value chain task force was germane to exploring and prioritizing alternative uses of cassava.
- 4) But subsidies for competing staples, such as maize, and limited support through food security procurement, have limited the scope for substitution and further upgrading in the cassava value chain.

Case Study 7: Lessons in upgrading in furniture value chains (South Africa and Kenya)

In 2000, the furniture business became the largest low-tech manufacturing sector, with a global trade of \$57.4 billion, exceeding both apparel and footwear (Kaplin-sky *et al.* 2003). With the advent of flat-pack and ready-to-assemble furniture, it has become an industry for mass production, although solid wood furniture manufacturers retain an important niche segment of the market. The industry has been through a period of intense competition, with prices falling. Three main kinds of buyers operate in the global wood furniture value chain: (a) large multi-store retailers (such as Ikea) that source from many suppliers (mostly in middle and high-income countries) and have a global retail reach; (b) small-scale retailers sourcing from a limited number of suppliers and countries (also low-income countries, especially for low-margin and price-sensitive products, such as garden furniture); and (c) specialized medium-scale buyers sourcing from many suppliers and countries, but selling to retailers in a single country or region (*ibid.*, pp. 7-9).

In terms of market access, tariff reductions in OECD countries have been accompanied by higher demands in terms of standards and certifications on quality management, developed by the International Organization for Standardization (ISO) (ISO9000), labour and social accountability (SA8000) developed by Social Accountability International (SAI) and environmental impact developed by the Forest Stewardship Council (FSC) (Morris & Dunne 2004). All three kinds of buyers are also increasingly expecting suppliers to adopt new technologies and improve production capacities. In the case of small-scale retailers and medium-scale buyers, suppliers are also expected to provide innovation in design. This has led to upgrading of processes and products, while functional upgrading has been limited to quality assurance, logistics and distribution where buyers do not claim proprietary interest, and to design only when buyers have expressed an interest in it (Kaplin-sky *et al.* 2003).

Attempted upgrading in the South African wood furniture value chain

The wood furniture value chain in South Africa is dominated by large companies at the production level, which grew under protection from imports and developed a large range of products with standardized features, with consequent limitations in design and flexibility of their product portfolios. Almost all wood used by these producers is sourced in South Africa.

Three large companies dominate the saw milling industry, using old technology and catering principally to the pulp and paper industry. The mills' reliability of supply, quality and flexibility of output are poor (Kaplinsky & Readman 2005; Kaplinsky *et al.* 2002). Although the value of furniture exports grew tenfold in the 1990s, the unit prices of exports fell by 250 per cent in the same period. This indicates that South African furniture suppliers are hanging on in the global value chain mainly on the basis of low price, low quality exports.

Given this situation, opportunities are being explored to upgrade the industry by using a different kind of wood (saligna, a fast-growing hardwood of the eucalyptus family) instead of pine. However, sawmills are geared for pulp and paper output and for cutting softwood, not for hardwood; thus, any upgrading strategy requires value chain cooperation from within, by different actors operating different functions. Such cooperation was set up under the Industrial Research Project, which organized a Saligna Network Workshop in 1998 with key value chain actors and facilitators. This led to the formation of the Saligna Value Chain Group. The group has been successful in generating information about upgrading; improving supply chain efficiency; developing new products; upgrading technical processing; and bringing about some changes in design, finishing and marketing. However, the price of sawn saligna timber paid by furniture manufacturers to sawmills has remained too low to make it worthwhile to direct efforts away from chipping and pulping logs. This is because manufacturers have used saligna to reduce costs, rather than to add value (Kaplinsky *et al.* 2003). In the absence of substantial improvements in design, finishing and branding, the expected upgrading approach is unlikely to materialize.

Hotel furniture in Kenya

The hotel furniture sector in Kenya provides insights into how local industries in Africa can manage to compete against foreign suppliers and to upgrade in the process. Given a limited manufacturing capability, one would expect that local suppliers would not be able to cater for upper-end hotels in Kenya. Yet, a study of selected four and five star hotels in the country (Schneider 1999) reveals that they purchased 95 per cent of hard furniture locally. Local suppliers were able to maintain the hotel market because they are able to supply a variety of furniture designs; interact with hotel-appointed designers in effective ways; maintain prices at lower levels than foreign competitors; specialize in products that overseas manufacturers find it difficult to provide; and, given their proximity and easy access, provide customization and one-stop services for maintenance, repair and replacement.

At the top end of the business, five local manufacturers have been able to upgrade their production systems to retain the hotel business, even when import

tariffs were lowered from 70 per cent to 37 per cent into the second half of the 1990s. Delays in deliveries from abroad and difficult replacements also played in the hands of local manufacturers. An additional factor helping the local industry is the importance of service provision from onsite visits prior to manufacturing to ongoing interaction with the hotel appointed designer, plus provision of manufacturing samples, installation, after sale services, maintenance and repair, and possible replacement (Schneider 1999).

Hotel contracts have spurred innovation and increased manufacturing activities in the wood furniture sector in Kenya. Product innovation has been directed by hotel buyers and designers, but process upgrading has taken place mostly internally in the industry. New designs have pushed manufacturers to try new processes, mostly without external help. Some manufacturers have also been able to transfer these skills to win contracts for fitting apartment buildings or to tender successfully for tailor-made office and bank furniture, even in other countries.

Lessons:

- 1) Despite impressive export growth, the South African furniture industry has remained stuck in a low-price, low-quality corner of the value chain.
- 2) Attempts to stimulate upgrading in South Africa have been only partially successful because of lack of value addition in finishing, design and marketing, and because of competing uses of wood for pulp and paper.
- 3) In the hotel wood furniture value chain in Kenya, local producers have been able to maintain their position vis-à-vis foreign competition and to upgrade products and processes; this took place through collaboration with hotel buyers and designers, customization and provision of services.

Case Study 8: Are biofuel initiatives the future of agro-industrial upgrading? (United Republic of Tanzania)

Biofuels are fuels that are generated by processing specific kinds of biomass, including agricultural crops, for use in transport, electricity production and for domestic uses (heating, cooking). Bioethanol accounts for over 90 per cent of biofuel production globally. It is produced by fermenting and distilling sugars from starchy plants (sugar cane, sorghum, wheat, maize, etc.) into alcohol. So-called 'second generation' bioethanols are under development, which will be produced from cellulose contained in forestry products, crop residues and domestic and industrial waste. Bioethanol can be used in 5 per cent and 10 per cent mixes in regular gasoline engines without modification. Bio-diesel is produced from oily crops or trees (such as soya, palm, sunflower, jatropha) and from animal fats and waste cooking oil. Some kinds of bio-diesel can be used in high-proportion mixes or even unblended in modified diesel engines. Second generation bio-diesel seeks to use non-fat biomass through gasification of wood or other waste (Dufey *et al.* 2007; Peters & Thielmann 2008).

Bioethanol is the most widely used biofuel for transportation, accounting for 3 per cent of global gasoline use in 2005. Bioethanol production doubled from 2000 to 2005. Brazil (from sugar cane) and the US (from maize) are the largest produc-

ers. In Africa, production capacity is increasing, especially in sugar cane producing countries (e.g. South Africa, Mozambique, the United Republic of Tanzania, Ghana), but production from other crops such as sweet sorghum and cassava is also being experimented with. Bio-diesel production is still small in comparison with bioethanol, and in 2005 it accounted for 0.2 per cent of all diesel fuel consumed for transportation globally. However, it is growing quickly (production tripled between 2000 and 2005). In 2005, 90 per cent of production was based in the EU (mostly from rapeseed), with Germany alone accounting for over 50 per cent of global production. The United States of America, Argentina and Brazil use soya for bio-diesel production, while some Asian and Latin American countries use palm oil. In Africa, much of the current and planned investment is focused on jatropha (Dufey *et al.* 2007; Peters & Thielmann 2008).

Actual and planned biofuel production in developing countries has spurred a heated debate, where objectives of improving energy security, abating carbon dioxide (CO₂) emissions and generating foreign exchange have been pitched against possible negative impacts on land use, rural livelihoods and food security. What is becoming clearer is that several strategic decisions have to be made by producing countries that can tilt the balance of outcomes one way or another:

Feedstocks: Outcomes of biofuel production depend on what kind of feedstock is used. For bioethanol, sugar cane is the crop that provides better financial returns, but has extensive land requirements and is often based on large-scale production (although outgrower schemes also exist). Sweet sorghum is emerging as a small-holder-friendly and more intensive alternative, which is also less sensitive to food security problems since the stalk is used in biofuel production, not the grain. Biodiesel stocks can be cultivated in more intensive farm systems, and in combination with other crops. Where rainfall is low and soils are poor, jatropha is emerging as a priority choice. Second generation biofuels require more complex technologies but use a much wider range of feedstocks, including waste.

Food security: Food, feed and biofuel production compete for the same land. Increasing biofuel production is likely to tie food prices more tightly to energy prices than has been the case in the past. Although second generation biofuels are expected to partially break the dependence on agro-based feedstock, these will take some time to develop and currently lower oil prices discourage investments in this area. Higher food and agricultural prices are positive for net-food sellers, while they are a problem for net-food buyers—the majority of rural households in developing countries.

Land use and environmental issues: Increased production of biofuels can originate from new land put into cultivation, changing land use in previously cultivated land, and from yield increases and improved processing techniques. Very optimistic assessments of the potential of expansion in 'marginal' lands in Africa have been made, as if this land was unused. These do not take into consideration the needs of pastoralists, of wild product collection, and of pressure on forests and biodiversity. Access to water is also an important issue. Furthermore, while it is generally accepted that sugar cane-based biofuel production yields net decreases in CO₂ emissions for the whole cycle of the product, this is much less clear in cereal-based production.

Smallholders: Production of biofuel for export is generally based on large-scale production, which generates economies of scale, but which also threatens to displace rural populations from their land, with no clear net benefits in terms of job creation. At the same time, outgrower schemes can also be set up to the benefit of smallholders. Smallholder biofuel production per se is more appropriate for local uses, especially in remote areas, which can lead to net welfare benefits and improved access to energy (Dufey *et al.* 2007; Zah & Ruddy 2009).

Biofuel initiatives in the United Republic of Tanzania

The United Republic of Tanzania is portrayed in the renewable energy industry as a country of great potential for biofuel production—with abundant land, a large labour force, a relatively friendly investment climate and political stability. About 94 per cent of the United Republic of Tanzania's energy consumption derives from biomass, mainly fuel wood. Biofuels are seen as a way of improving the country's access to cleaner and affordable fuel for domestic and transport use, decrease pressure over deforestation, and lighten the burden of fossil fuel imports. A number of initiatives are taking place in the country at different scales of production and with different feedstocks.

Firstly, there are many *micro-scale* initiatives throughout the country, generally focused on biogas production from livestock waste and seedcakes and on jatropha-based oil. These are mostly used to provide fuel for clean cooking stoves, electricity generators and farm vehicles. There are an estimated 1,000 biofuel plants in the country. The objective is to deliver energy and fuel at the local level (Martin *et al.* 2009).

Secondly, *small-scale* biofuel initiatives in the United Republic of Tanzania are still at the initial stages of development. They are often driven by foreign investors, build on outgrower schemes and focus on jatropha cultivation and processing (van Eijck & Romijn 2008)—in one case, cultivation is being promoted on land damaged by pit mining; in another palm oil cultivation is being piloted. 'Small' in this context means a total area between 200 and 2,000 hectares (ha), intercropping and production of 'straight vegetable oil' (SVO) for energy and vehicle use locally (Martin *et al.* 2009).

Thirdly, the most prevalent form of investment in biofuels in the United Republic of Tanzania is *medium-scale* developments (2,000 to 50,000 ha) by foreign investors, although plans are in the pipeline for large-scale developments as well (over 50,000 ha). Medium-scale initiatives are currently limited to producing straight-vegetable oil (rather than bio-diesel) to be used on converted fleets. One of such initiatives in Arusha started purchasing jatropha seeds from farmers under an outgrower scheme based on 10-year contracts, with a plan to produce 1.5 million litres of bio-diesel that can be exported to Europe duty-free. A second initiative has involved the acquisition of 8,000 ha of land to establish a large-scale farm for jatropha cultivation. A third initiative is based on sweet sorghum feedstock—here, the plan for the pilot project is to lease 2,000 ha for a large-scale farm, return the grain to local communities, while the stalk will be used for the production of energy and bioethanol with a new technique known as 'advanced solid state fermentation'.

The economic viability of such project depends on oil prices remaining over \$45 per barrel. Main hurdles in future developments of biofuel projects in the United Republic of Tanzania remain the relatively high price of some feedstocks, such as jathropa (van Eijk & Romijn 2008), and the recent fall in oil prices in 2009, which has led some major projects to be shelved.

Lessons:

- 1) The economic feasibility and socio-environmental impact of upgrading through biofuel production depend on several critical factors—some are exogenous to producing countries such as oil prices, but others can be shaped by strategic and industrial policy decisions.
- 2) Biofuel feedstocks that are adaptable to small-scale cultivation and/or to outgrower schemes are more likely to impact positively on welfare and the environment in rural areas of the United Republic of Tanzania; these are more attractive when focused towards local domestic and transport use, especially in remote areas.
- 3) Large-scale biofuel production can also have a role to play in view of rural industrialization, employment generation and foreign exchange savings through substitution for imports of fossil fuels, given that enough attention is paid to their impact on land and water use and food security; recent advances in technology can also facilitate welfare enhancing biofuel production, for example by using sweet sorghum stalks while the grain is distributed to local communities.

Case Study 9: Upgrading, downgrading or both in the wine value chain (South Africa)

South Africa's wine production has a long history. The first vineyards were planted in the Cape peninsula by Dutch settlers as early as 1655. Constantia wine was very popular in Europe at a time, and apparently a favourite of Napoleon. At the beginning of the nineteenth century, wine represented almost 90 per cent of exports from the Colony (Vink *et al.* 2004, p.229). But by the end of the century exports had almost collapsed. In 1861, the United Kingdom—the main importer of South African wine at that time and again today—and France signed a trade agreement that made French wines cheaper to import. The spread of phylloxera in the late nineteenth century destroyed most of the vineyards in the Cape (Ewert *et al.* 2002). In the early twentieth century, the new giant cooperative, the *Ko-öperatieve Wijnbouwers Vereniging van Zuid-Afrika* (KWV) was granted the statutory powers to regulate the industry. KWV controlled sales and stabilized prices, and later on managed a quota system regulating new plantings, varietal choices and vine material imports. This period was characterized by a focus on high yields and volume over quality, and an overall preference for the production of brandy and fortified wine. Throughout the twentieth century, production (and presumably consumption) increased right until the advent of the new 'quality era' in the early 1990s (Williams 2005). Exports, on the other hand, declined from a minor (5.1 per cent in 1964) to an insignificant (0.8 per cent in 1988) part of total output (Vink *et al.* 2004, p.236). Table wines, in turn, represented only a small proportion of total

exports, and were handled by the KWV in accordance with its export monopoly. As a result, almost no South African grower or cellar had any experience of foreign markets until KWV's regulatory powers came to an end and sanctions were lifted in the early 1990s.

It was only from then that upgrading in the industry took place, owing to the opening of international markets, the (relative) novelty of South African table wine, and a weak Rand. These forces remained relevant until the early 2000s. However, by 2005, with the Rand strengthening and the start of a red wine 'glut' in the global market, the outlook began to change. In 2006, the industry witnessed decreasing exports, a number of bankruptcies, and a general decrease in profitability and competitiveness. Signs of recovery were detectable from 2007 onwards as the Rand began weakening once more.

Product upgrading

A 'traditional' value chain reading of product upgrading in South African wine in the last fifteen years gives a positive picture (Table 4.2). Intrinsic quality improved, exports took off, the proportion of bottled exports (vis-à-vis bulk exports) also increased (at least in the 1990s), the proportion of red varieties and of 'noble varieties' (in both reds and whites) grew, a larger number of top quality wines became available, and sales of wine under the Wine of Origin scheme increased. In other words, the South Africa industry is now providing the international markets with wines of higher average quality, the right styles and alcohol content, and the right varieties as never before.

Table 4.2: Overview of product upgrading in the South African wine industry	
Product upgrading	
<i>Aspect of upgrading</i>	<i>General trend</i>
Unit price	Increased only slightly
Overall intrinsic quality	Improved
Red/white composition	More reds
Proportion of exports over total production	Increased
Proportion of bottled exports vs. bulk exports	Increased, but then stagnated in the 2000s
Proportion of natural vs. rebate/ distilling wine production	More or less the same
Noble variety production	Increased
Top quality wines	Number and visibility increased
Alcohol levels	Increased
Proportion of wine certified under Wine or Origin Scheme (generic indications)	Increased
Proportion of wine certified under Wine or Origin Scheme (specific indications)	No large increase given the growth of exports
Product consistency	Improved

However, once rewards and risk are factored in the discussion, the assessment becomes less rosy. Unit prices have increased only slightly. Varietal risk has increased as Chenin Blanc production has decreased dramatically. Chenin Blanc is a resilient grape variety that can be used to make very different styles of wine (and for distilling wine if necessary), thus providing a degree of flexibility to grape farmers. Conversely, the failure to plant more red varieties (held to be problem by wine industry consultants until recently, due to increasing international demand for reds) has been a boon for the industry—as the red wine glut unfolded in the last few years. Furthermore, the risk related to high reliance on a few end markets (and especially the UK) has not decreased sufficiently—export destination diversification is still limited.

Other indicators show a mixed picture of product upgrading, broadly defined: First, the industry has not grown much in terms of total volume of production, although consistency, aggregation of orders and logistics have improved; second, its make-up in terms of production of wine, rebate/distilling wine and non-alcoholic has not changed much, which is not necessarily bad if one takes risk into consideration, but would be read as a failure from a value added perspective; third, the growth of ‘wine of origin’ certifications has been satisfactory, but only in relation to generic geographic origin, not more specific ones (for details, see Ponte & Ewert (2009); Ponte (2009)).

Process upgrading

Some clear elements of process upgrading have also taken place in the South African wine industry (Table 4.3). Viticulture and winemaking operations have improved dramatically. But significant productivity gains can still be had if workers were trained differently, paid better and ‘empowered’ in one way or the other. The industry has embarked on a number of certification initiatives. However, many of the improved processes and obtained certifications are part of what is now expected as a given by retailers, and do not provide a competitive advantage, just potential entry into the market or maintenance of an established position. Perhaps the weakest improvements have been in branding and marketing. There seems to be a consensus amongst both local and international analysts that too many (cooperative) growers still have a production (instead of market) orientation and that South Africa has too few successful brands.

Another aspect related to process upgrading that has been less examined in the literature is achieving higher margins with the same (or similar) products by accessing higher-margin markets. In relation to South African wine, Sweden and the US have been the main targets of such an effort. The UK, despite being the main export market for South African wine, is considered by many a blind alley because large retailers are very demanding on logistics, volume, promotional support and demand very competitive prices. Germany and the Netherlands, South Africa’s number two and three export destinations are also extremely price-sensitive. The US and Sweden, for different reasons, provide a better perspective for South African exporters. Yet, they still constitute a small proportion of exports.

Table 4.3: Overview of process upgrading in the South African wine industry	
Process upgrading	
<i>Aspect of upgrading</i>	<i>General trend</i>
Managerial systems	Improved
Viticultural practices	Improved
Winemaking practices	Improved
Labour	Some upgrading of permanent workers' skills; increased proportion of casualized labour
Food safety and quality management certifications (British Retail Consortium, International Food Standard, HACCP, ISO 9000)	Becoming more common
Environmental and social certifications	Entering the industry, but not common yet (except for fair trade)
Marketing, advertising, provision of promotional support	Improving, but still a weak point
Brand recognition	Improving, but mainly due to Europe-based marketers
Brand South Africa recognition	Not strong enough, especially in the US
Accessing higher-margin markets	Some success in Sweden, limited but promising inroads in the US

Functional upgrading

Three main changes relating to functional upgrading have been taking place in the South African value chain for wine in recent years (Table 4.4). First, a classic vertical disintegration process is taking place, where many private cellars and producer-wholesalers are moving away from grape growing. Alternatively, they are reducing their engagement in grape growing or engaging in it in more hands-off ways. Some of the most successful producer-wholesalers have largely moved away from wine-making as well, thus divesting from holding fixed capital.

Second, international wine marketers and drinks conglomerates have not made substantial investments in South Africa. Involvement by large overseas drinks conglomerates and brands (for example, by Pernod-Ricard, Constellation/Kumala, Gallo, Foster/Lindeman, Diageo/Blossom Hill) have been based on marketing and branding agreements, not on developing or taking over vineyards and cellars.

Third, the few South African producer-wholesalers and marketers who used to have their own agencies in the UK and Europe are either divesting from them or entering into joint-ventures with Europe-based branders and marketers. Many of the most successful brands of South African wine in the UK are owned or co-owned by overseas companies. These are processes of functional downgrading from a point of view of South African producers—yet, they have yielded positive results at least in terms of 'moving volume'. Conversely, about half of the cooperatives and ex-coop-

eratives that were interviewed for the study have become more engaged in direct marketing and branding through joint ventures (which may also involve co-ownership of a brand, rather than just marketing agreements), some with very successful results. This is an example of functional upgrading on their part. UK agents and marketers also had to functionally upgrade. Under pressure from shorter lead times, they had to increase their control over logistics (some importers are now selling to retailers with delivery executed at the warehouse in the UK instead of ‘free on board’ on the ship in Cape Town). As retailers are seeing themselves increasingly as shelf-space providers, replenishment as a function falls upon UK agents. Much product innovation, new packaging, new presentations and styles are also generated by these agents/marketers. This does not mean that upstream learning is not taking place. Until the early 1990s, quality in South African wine was producer-generated, while now cellars and South African marketers are able to interpret consumer market changes and react to downstream requests much more quickly and efficiently.

Functional upgrading	
<i>Location of upgrading</i>	<i>General trend</i>
In South Africa	Cellars and producer-wholesalers are moving away from (or reducing involvement in) grape growing
	Producer-wholesalers moving away from (or reducing involvement in) winemaking
	Some cooperatives and ex-cooperatives are more engaged (through joint ventures) in marketing and branding
	Product innovation increasingly done by European/US marketers and agents
In Europe	South African producer-wholesalers and marketers divesting from their own agencies in the UK and Europe
	South African producer-wholesalers and marketers entering in joint ventures with Europe-based agents and marketers
	Exclusive brand ownership by South African actors decreasing
	European markets and agents taking over more control of logistics and replenishment

Lessons:

- 1) In the South African value chain for wine, improved product quality, better processes and some functional upgrading have co-existed with downgrading pressures such as demands for higher volume of basic quality wines and increasing demands for bulk delivery.
- 2) Shorter lead times and flexibility in delivering to buyer specifications have been a key element in upgrading; however, this also translates into pressures for the casualization of labour at the farm and cellar levels.
- 3) Demand-driven wine styles, volume and consistency have allowed the industry to grow in the basic quality segment of the industry, while the proliferation of higher quality wines has opened new niches.

- 4) The package of specifications that are expected to be delivered as a given has become increasingly demanding and sophisticated; while this has in turn stimulated further process upgrading in the form of vineyard practices, wine cellar innovation, better managerial practices, and more systematized quality management, its rewards have been limited and some types of risk have increased.

Case Study 10: Upgrading trajectories in the cotton-to-garments value chain

The cotton-to-garments value chain has a complicated structure that spans cotton production, ginning, yarn spinning, and textile and garment manufacturing. The value chain is increasingly organized into separate functions that are carried out in specific locations depending on cost, quality, time to market and logistics needs (and, until recently, on the availability of garment quotas). Each function can be seen as a separate value chain with its own dynamics of governance and upgrading. It is a truly global industry, with intermediate products shipped to and from different parts of the world and a substantial component of South-South trade (Roepstorff 2007). This is also an industry where external factors shape or have shaped important elements of its structure—from the Multifibre Arrangement (MFA) (a quota system for garments which was in force until 2005), to preferential trade agreements such as the African Growth and Opportunity Act (AGOA) and Everything but Arms (EBA), to the cotton subsidies still existing and provided to local producers in OECD countries.

The purpose of this brief case study is to highlight some lessons that go beyond changes in external international regulatory and institutional factors to highlight some key internal value chain dynamics that merit attention, especially in relation to upgrading. In order to shed light on such dynamics, and given the limited space available for this case study, focus is placed on the two extremes of the cotton-to-garment value chain: cotton production and garment manufacturing. On upgrading possibilities for sub-Saharan African countries in yarn manufacturing and textile production, see Roepstorff (2007) and Gherzi (2009).

The case study of cotton, based on the comparative experience of Zimbabwe and the United Republic of Tanzania between the mid-1990s and the early 2000s, shows that market liberalization in producing countries has placed new challenges for national origins to maintain their reputation (and thus a premium) in the international cotton lint market. Given that the cotton chain is not yet highly driven by a group of lead firms, as is the case in many other value chains, many of the improvements that are needed in order to keep up with quality are linked to the general reputation of a national origin, and thus are dependent on how local institutional and organizational setups function.

The case study on garments is based on the experience of Mauritius with different forms of upgrading, and especially on what needs to be learnt from: (a) the failure of some firms to move to own-brand manufacturing; and (b) the relative success of other firms in focusing on more basic products with longer runs and lower margins via delocalization to Madagascar.

Governance in the cotton value chain

Cotton is one of the few agricultural products grown in Africa in which the value chain is not clearly buyer-driven (Gibbon & Ponte 2005)—although this may be changing (see below). Both cotton producers and textile manufacturers (the main buyers of cotton yarn) are highly fragmented. Most yarn spinners are now based in developing countries—where they source a majority of their raw material requirements on their own domestic markets. While most internationally traded cotton passes through the hands of global trading companies, it is also common for spinners to bypass international traders by sourcing directly from ginneries (those processing raw cotton into cotton lint) in exporting countries.

International traders generally seek to maximize both volumes and varieties, but perform few services for the spinners other than supplying to order. Traders do not blend cotton, nor normally even measure any but its most traditional quality dimensions. Although international traders frequently use local agents (whom they finance in advance) to procure cotton on their behalf, they also invariably buy and gin on their own account in the most important supplying countries. In this sense, they cannot be properly regarded as lead firms (Gibbon & Ponte 2005).

There is nonetheless a kind of hierarchy within the chain, with a few large spinners, a group of international traders, and a group of developing country producer associations sharing influence. International traders seem to be the ones currently under most pressure. Since March 2008, the number of cotton traders active on the main US cotton exchange is reported to have shrunk by a third, partly as a result of price instability. Dunavant, one of the largest traders, and Allenberg are expected to merge. Reinhart, a cotton trading house founded in the eighteenth century, is one of many that has filed for bankruptcy. According to trade sources, the cotton industry is becoming increasingly concentrated in the hands of four multi-commodity companies, including Olam and Cargill (Blas & Meyer 2010). As the cotton value chain becomes more concentrated in fewer hands, it could become more driven than in the past.

At the same time, the power equilibrium between African producers and international traders has also tilted to the benefit of the latter as producing country market liberalization has led to the fragmentation of their export-bases (due to the end of export monopolies). Most smallholder producers have lost key public services such as seed and other input supplies, credit and extension, especially in Eastern and Southern Africa but increasingly in Francophone West Africa as well. Producers in northern countries like the US, on the other hand, continue to benefit from public support and subsidies.

Because of the lack of clear driving in the cotton chain, reward systems still primarily reflect the global supply/demand balance, adjusted for the balances for specific recognized cotton varieties—while subject to exogenous distortions, such as producing country subsidies. The international cotton trade is organized in a single non-anonymous market bifurcated between ‘coarse’ and finer cottons (more recently also diversifying into organic and ‘sustainable’ cottons). These are differentiated in relation to each other and according to globally recognized national

origins and quality descriptions. 'National origins' are a summary of varietal characteristics, typical forms of harvesting (mechanical or by hand), and types of ginning (roller or saw), while quality still refers in large part to those physical properties of the crop that reflect husbandry practices, such as contamination levels. Global reference prices exist for finer cottons (the Cotlook A index) and for coarser ones (the B index). The main impact of demands for improved or new qualities on the part of more technologically-advanced spinners has been to put a greater emphasis on the implicit reputational dimensions of national origins. Thus, upgrading is still a possibility, but entails an improvement in such reputational dimensions. Therefore, appropriate local provision of quality and input infrastructure is essential to maintain national origin reputations and the premiums attached to them in the market.

Cotton quality dynamics in Zimbabwe and the United Republic of Tanzania

Research behind the cotton value chain case study covered the cotton sectors of Zimbabwe and the United Republic of Tanzania between the mid-1990s and the early 2000s (Larsen 2008). Both sectors underwent liberalization in the 1990s. However, quite different stories of upgrading/downgrading followed. In Zimbabwe, liberalization led to the emergence of an effective local market duopoly, in which the players were the privatized former marketing board (Cottco) and Cargill, later on joined by a number of other smaller companies. Cargill is a major player on a global scale in the sector, buying from enough producing countries to acquire both large volumes and a wide varietal profile. Cottco took the decision to continue with a strategy established already in the period when it was a parastatal enjoying an export monopoly, namely to maintain and defend the quality reputation of the national origin (which has usually commanded a 10 per cent premium above the international price index Cotlook A). It used this strategy as a lever to bypass international traders and to sell cotton directly to spinners, mostly based in Europe.

Both players in the Zimbabwean sector had an interest in maintaining both high volumes and the practice of grading cotton purchases at the level of primary purchase, in order to defend the national reputation and hence the premium attached to it. As a result, they have competed internally mainly on market coverage and supply of inputs rather than on price. Cargill operated an input voucher scheme and subsidized input prices while Cottco operated a successful input credit scheme. These interventions resulted in record levels of production at least in the early 2000s (before the further deterioration in the political situation and the eviction of large-scale commercial farmers from their lands) and rising yields for those smallholder producers who were members of these schemes (Larsen 2008).

The cotton liberalization experience in the United Republic of Tanzania was an almost completely contrasting one. Market liberalization was associated with very high levels of entry by mostly small-scale trader-ginners, fierce competition on price, and the elimination of grading at the first point of sale. Private ginners bought cotton across different sub-varietal zones and irretrievably mixed the local seed

stock. Inputs were supplied by only a few ginners, and then only episodically and on a cash basis. Insecticide availability declined dramatically.

As a result, a decreasing proportion of exports in the United Republic of Tanzania were traded via Northern European ports in the early 2000s, with a parallel decline in the premium that it traditionally commanded. As a result of falling volume and quality, some leading international traders lost interest in the crop. Cotton from the United Republic of Tanzania still commanded a premium on the world market, but mainly on the basis of its time window (appearing at the beginning of the world cotton ‘new year’) and near-unique traditional (roller) ginning method. But even the roller ginning premium was being eroded as many of the newly installed ginners use the saw ginning method, which commands a lower quality premium. A more positive outcome was that time to market decreased rapidly with liberalization and the proportion of the crop sold through the time premium window rose sharply.

In summary, the Zimbabwean experience shows that upgrading (defined here as defending an established reputation in the international market) took place through proper management of quality on the basis of a sophisticated system of quality grading and control, and on adequate input provision. In the United Republic of Tanzania, cotton experienced a process of downgrading and a loss of reputation due to lack of organization in the sector, failed provision of inputs and mishandling of seeds. A parallel set of experiences took place in Uganda (similar to the United Republic of Tanzania’s) and Zambia (similar to Zimbabwe’s) (Larsen 2008).

Governance in the garment value chain

A very large literature has been dedicated to the issue of governance in the garment value chain (see i.a. Gereffi 1994). This chain is generally considered to be ‘buyer-driven’ by retailers and branded manufacturers. It is also apparent that the number of countries from which lead firms source, has declined since the end of the MFA. Roepstorff (2007) indicates a decline from around 70 countries to roughly 20, with China and India gaining substantial market shares. Two other general trends should be highlighted in relation to the division of labour along this value chain. The first is an increasing proliferation of types of intermediaries serving retailers and branders. The most important ones are global trading houses—companies that finance and organize production in developing countries on behalf of retailers. But one also finds specialized importers (playing an important role in many markets) and ‘global contract manufacturers’ working for some of the large US retailers. These contract manufacturers typically have production bases in several countries spread across at least two different continents. The second general trend is for garment retailers to emphasize supply-base rationalization – and in particular chain ‘shortening’. This entails the (partial) adoption of direct sourcing, in the sense of dealing directly with manufacturers in producing countries that are able to offer a large number of add-on services (Gibbon & Ponte 2005).

Expectations concerning which combination of services suppliers must offer differ between end markets and between buyers in these markets. But in general there has been a move toward demanding that suppliers finance and organize fabric

procurement on their own account, even where control is retained by retailers over exactly which fabrics a manufacturer should use. There is also a widespread move toward expecting that suppliers should hold fabric on their own account for the length of a season. In all cases buyers (or those buying on their behalf) set fixed prices that have to be matched by their suppliers, with little or no room for negotiation. A clear tendency is for unit prices to be forced down over time, and for an increasing share of production to be contracted on lead times shorter than three months.

Own-brand upgrading in Mauritius

The classic work on upgrading in garments, based on the Hong Kong experience, suggests an optimal trajectory where firms move from simple functions such as assembly or 'own equipment manufacture' (OEM) to more complex ones such as 'own design manufacture' (ODM) and eventually 'own brand manufacture' (OBM) (Gereffi 1999).

However, as Gibbon (2008) points out, while product differentiation and OBM do correspond to carrying out higher-value functions, they may also embody 'competency traps' represented by design and branding in highly product-specific forms that cannot be generalized. This is particularly likely where distance to major end markets is great. At least for new or subordinate players, such as suppliers in Africa, there are equally, or more, profitable positions available within value chains and other available forms of upgrading. The case study of Mauritius is an example of this.

Gibbon's (2008) study identified two distinct strategies followed by Mauritian-owned firms, in order to remain competitive in a context of rising local labour costs and falling margins. The main features of the first strategy closely resembled the Hong Kong trajectory—companies upgraded into ODM and in some cases OBM. The main feature of the second strategy was to concentrate on manufacturing alone, while opening satellite plants in neighbouring (and much lower cost) Madagascar. Firms' objectives here were to produce a more basic range of products in very high volumes—while retaining capacity in Mauritius for shorter lead time and higher-value work.

Gibbon's interviews with company directors and analysis of (publicly-deposited) company accounts revealed that—in Mauritius at least—upgrading to OBM was both costly and unsuccessful. Mauritian companies were simply too far from end markets to set, or even closely follow, fashion trends. They were also too narrow in their range of managerial skills to wholesale or retail on their own account. Companies migrating to Madagascar also faced new costs, but many appeared to have succeeded both in raising their margins and consolidating their customer base (except for the involuntary contraction of production coinciding with the serious civil disorder of 2002). In similar ways to the case study of wine in South Africa, this was on the basis of downgrading rather than upgrading part of their product range and part of their production process (as well as the skill base of part of their workforces). Such a route nonetheless enabled the enterprises concerned to offer a broader mix of products with a wider range of price points and lead times to a wider

range of customers, including some who offered them greater stability of demand than they had enjoyed previously (Gibbon 2008; Gibbon & Ponte 2005).

Lessons:

- 1) In value chains, such as cotton, where there is not (yet) a clear group of chain drivers, maintaining national reputations for quality is of utmost importance; local industries have to be either well-organized (usually, with a few dominant players) or have to regulate the delivery of 'public goods' such as quality control and grading, and input provision.
- 2) In the Zimbabwean cotton sector, national premia for cotton quality were preserved despite market liberalization, as a result of the maintenance by a few dominant firms of quality grading and management, and appropriate input provision. The opposite experience took place in the United Republic of Tanzania, where a large number of players came into the domestic buying market, quality control broke down, input provision collapsed and seeds from different regions were mixed up—this resulted in lower premia for these national origins, except for early season supplies.
- 3) In the garment value chain, which is clearly buyer-driven, retailers and branded manufacturers are increasingly placing new demands on their suppliers at the same time as they apply downward pressures on prices and lead times. In this context, the classic upgrading trajectory from assembly to OEM, ODM and eventually to OBM, may be a tricky one to follow, especially for new or subordinate players, such as suppliers in Africa—who may be better off trying other available forms of upgrading.
- 4) In Mauritius, the attempted movement towards OBM by some firms failed. Others were more successful in concentrating parts of their production mix on longer runs of more basic products by opening plants in Madagascar, while keeping higher value added lines operating in Mauritius. This enabled them to offer a broader mix of products with a wider range of price points and lead times to a wider range of customers.

4.5 Lessons and recommendations for industrial policy making

Table 4.5 provides a situational analysis of the selected value chains and a brief qualitative description of their governance structures. In general, governance of the ten value chains described falls within three categories: (a) value chains driven mostly by global/local buyers (FFVs, furniture, wine, garments and to some extent organics); (b) value chains driven primarily by producer multinationals (pineapples, biofuels); and (c) global/local value chains that exhibit low levels of 'drivenness' (fish, dairy, cassava, cotton). Three general findings on upgrading arise from these experiences: (a) that steep upgrading trajectories are indeed possible in Africa, both in global and domestic-oriented chains; (b) that the 'best' upgrading trajectories are not necessarily the ones where the aim is to obtain the highest value added; and (c) that often optimal outcomes arise from a mix of both upgrading into higher value-added products or functions and at the same time maintaining or expanding lower value added but high volume products or functions.

Table 4.5: Situational analysis and value chain governance		
Value chain	Situational analysis	Value chain governance
Fresh fish (Nile perch)	Exports from the United Republic of Tanzania and Uganda started in early 1990s and increased dramatically; EU import bans in 1997-2000 based on food safety concerns threatened future participation; industry and governments responded resolutely and regained market access; further growth of industry from 2000 onwards.	Low level of drivenness.
Organic coffee and cocoa	Uganda enjoyed first-mover advantage; donor support provided incentives for exporters to set up contract farming schemes that were used for organic certification; first certifications in coffee and cocoa took place in late 1980s and early 1990s.	Driven by branded manufacturers but less so than in the conventional coffee and cocoa value chains.
Fresh fruit and vegetables	Kenya originally exported 'Asian vegetables' in bulk; moved to fresh fruit and vegetables, pre-packed and prepared; impressive growth of exports by value since the late 1980s; most products exported to the UK.	Highly driven by retailers.
Fresh pineapple	Exports from Ghana to Europe (mainly of Smooth Cayenne variety) affected by aggressive marketing by Del Monte and other MNC producers with large interests in Latin America; new investment by the same MNCs in Ghana helped recover exports, but on the basis of large-scale farms producing a different variety, not smallholder production as previously.	Highly driven by large-scale branded producers and by retailers.
Dairy	Large local processors developed a fairly sophisticated market for processed milk and other dairy products for the local and regional markets in the past few decades (more in Kenya than in Uganda); however, up to 80% of total milk is still traded in raw form.	Raw milk value chain not driven; processed dairy value chain driven by local large-scale processors.
Cassava	Cassava is an important 'hunger' crop, which is mainly consumed and traded locally in fresh form; resilient to drought and easy to store as long as it is not harvested; once harvested, needs to be processed within 3-4 days; initiatives are seeking to improve the local 'fresh' cassava market and to develop new 'dry cassava' products (high quality cassava flour, animal feed, industrial uses).	Low level of drivenness.
Furniture	South Africa: fast growth of exports in the 1990s, but with rapidly falling unit prices; remains stuck in the low-end of the market; local initiatives seek to promote the use of a different tree variety and environmental certification; Kenya: local manufacturers have been able to supply hotel chains despite the competition from imports.	Global: highly driven by multi-store retailers; Local: low drivenness, except for value chain driven by hotels.
Biofuels	Biofuel production still at its infancy in the United Republic of Tanzania; new projects run by foreign investors are exploring use of sugar cane and sweet sorghum for ethanol production and jathropha for bio-diesel; sweet sorghum particularly interesting as only stalk is used for biofuel production, while grain can be used for food.	Global: highly driven by large MNCs in the energy/renewable sector; Local: driven by biofuel producers

Value chain	Situational analysis	Value chain governance
Wine	South African wine exports experienced fast growth as a result of the end of the apartheid regime; but supermarket chains especially in the UK are becoming more demanding on price, quality, and logistics; the local market is growing slowly and in more profitable markets (such as the US) South Africa still has a marginal presence.	Global: highly driven by retailers; Local: highly driven by large wine producer-wholesalers.
Cotton-to-garments	Cotton: the chain does not have a clear group of lead firms; in this context, maintaining general reputation for quality from a national origin is important for maintaining quality premiums, especially following market liberalization that took place in the 1990s in both the United Republic of Tanzania and Zimbabwe. Garments: main buyers of garments are sourcing from a smaller number of countries and placing more demands on suppliers; competitive pressure from China and India is increasing on suppliers especially with the end of the MFA.	Cotton: low level of drivenness, but may be changing; Garments: highly-driven by retailers and branded manufacturers.

Table 4.6 summarizes the salient traits of upgrading and value addition trajectories in the ten case studies.

Value chain	Upgrading trajectory	Limitations, threats, risk and vulnerability
Fresh fish (Nile perch)	Food safety procedures improved, processing plants upgraded, product quality improved, some landing sites upgraded.	Intensive extraction of resource is threatening sustainability; vulnerable to swings in market demand limited by strong demand for fish generally; risk of displacement by farmed and lower cost species from Asia present; new food safety infrastructure decreased risk of EU imposing further bans.
Organic coffee and cocoa	Improved intrinsic quality; premium paid for organic coffee and cocoa; improved primary processing and handling procedures; improved access to extension through contract farming schemes.	Lower vulnerability to international price fluctuation because of higher quality achieved and price premium offered; risk of market demand fluctuation for organics recently heightened due to financial crises and economic stagnation in OECD countries.
Fresh fruit and vegetables	Product, process and functional upgrading achieved; new product forms exported, investment in new packaging and preparation technologies.	Supermarket chains increasingly demanding on quality, logistics, lead time; downward pressure on prices and returns; seasonal and flexible demand leads to flexible and casual employment relations; higher risks and vulnerability for most participants.

Table 4.6 continued		
Value chain	Upgrading trajectory	Limitations, threats, risk and vulnerability
Fresh pineapple	Started production of new variety requested in EU markets; entry and/or expansion in new niche markets (sliced and vacuum packed, organics, fair trade).	The introduction and promotion of a new variety of pineapple in Europe has displaced smallholder production in Ghana; niche market entry will only cover part of displaced production; future of industry in the hands of large-scale commercial farms linked to producer MNCs.
Dairy	Traditional upgrading in the local raw milk value chain, focused on animal husbandry, processing technology and improvements in organizational structure; however, a large proportion of milk is marketed through non-regulated channels that lack basic sanitation measures, which have not been targeted by external interventions.	Challenge for upgrading in the raw milk value chain for local markets is to find low-cost and accessible methods for sterilization, cooling and packaging that do not significantly add to the final consumer price of milk.
Cassava	Efforts to upgrade cassava use for livestock feed, high quality flour and industrial uses.	Difficult to change consumer acceptance of cassava-based product mixes in areas where the crop is not a main staple; subsidies for maize production make substitution with cassava-based products less likely.
Furniture	South Africa: volume expansion, but little movement on upgrading finishing and design; Kenya: buyer and designer-led process and product upgrading took place in the local hotel furniture sector.	Limited prospects for further upgrading as sawmill industry in South Africa more geared towards providing inputs to pulp and paper production than furniture manufacturing.
Biofuels	Cultivation of feedstock for biofuel has started; some production of 'straight vegetable oil' but not yet bio-diesel; jatropha-based production is expanding; new technologies are promising potential in terms of minimizing impact on food security.	Lower oil prices have stalled some major biofuel projects; price of some biofuel stocks is still too high; focus on expansion of large-scale production inhibits a more balanced expansion of small-scale production for local energy and fuel use.
Wine	Better product quality, improved processes and some functional upgrading have coexisted with processes of 'downgrading' (larger volume production of basic product).	Supermarket chains increasingly demanding on quality, logistics, lead time; downward pressure on prices and returns; volume growth limited by lack of suitable land in South Africa; branding increasingly controlled by foreign actors; local market still underdeveloped.

Value chain	Upgrading trajectory	Limitations, threats, risk and vulnerability
Cotton-to-garments	<p>Cotton (Zimbabwe, mid-1990s to early-2000s): a few dominant firms maintained quality control, grading and input provision—defended price premium; the opposite took place in the United Republic of Tanzania during the same period.</p> <p>Garments: successful Mauritian firms invested in longer runs of more basic products in Madagascar while keeping higher value-added lines operating in Mauritius.</p>	<p>Cotton: entrance of other firms in the local market may undermine the quality control and input supply system.</p> <p>Garments: end of MFA and increased consolidation among buyers put increasing pressure on the part of value-added garment production still carried out in Mauritius.</p>

Several lessons can be drawn from these experiences in relation to upgrading and value addition possibilities in Africa. First, these are presented with reference to the individual case studies (Table 4.7). Second, a more general set of considerations is outlined.

Value chain	Upgrading lessons
Fresh fish (Nile Perch)	Successful private-public cooperation between active fish industry associations and receptive fishery departments in Uganda and the United Republic of Tanzania, with some support by donors, was essential in addressing past food safety failures and in leading to improved processing plants, regulation and operating procedures. At the same time, export-oriented success based on harvesting of natural resources is likely to sow the seeds of its own demise if appropriate management systems are not in place. The long-term sustainability of upgrading trajectories is essential.
Organic coffee and cocoa	A small group of dynamic exporters and early and targeted donor support made it possible for Uganda to be an early mover in organic exports in Africa, with a neutral stance by government. But higher profitability for organic-certified farmers than for non-certified ones is dependent on the organization of certified organic production in contract farming schemes. It is the specific design features, rather than contract farming in general, that can generate welfare improvements among organic smallholders.
Fresh fruit and vegetables	Upgrading took place mainly without government intervention and donor support in Kenya, and learning took place internally in the value chain from actors downstream of local operators.
Fresh pineapple	Improvements in economies of scale and logistics, and upgrading to the newly desired variety consumed in Europe, took place in Ghana, but in this case mostly as a result of dislocation of local small and medium-scale production by subsidiaries of large producer MNCs.

Table 4.7 continued	
Value chain	Upgrading lessons
Dairy and cassava	Steps are being taken in dairy and cassava value chains to promote efforts to upgrade products and processes and to find markets for new product forms. In dairy, there is a new focus on upgrading in the local raw milk market rather than in the country-wide value-added markets in Kenya and Uganda. In cassava, local consumption preferences have been taken into consideration when devising alternative upgrading paths in Zambia.
Furniture	South Africa's upgrading in the global value chain basically failed. Volume of sales increased while sales prices decreased due to buyers' downward pressures. Decreases in unit costs due to economies of scale were not enough to compensate for falling sale prices. The industry failed to enact improvements in design and finishing. In the local value chain in Kenya, on the other hand, hotel buyers facilitated a steep upgrading process by local producers.
Biofuels	<p>Biofuel feedstocks that are adaptable to small-scale cultivation and/or to out grower schemes are more likely to impact positively on welfare and the environment in rural areas in Africa; these are more attractive when focused towards local domestic and transport use, especially in remote areas.</p> <p>Large-scale biofuel production can also have a role to play in view of rural industrialization, employment generation and foreign exchange savings through substitution for imports of fossil fuels, provided that enough attention is paid to their impact on land and water use and food security; recent advances in technology can also facilitate welfare-enhancing biofuel production.</p>
Wine	Improvements took place in South Africa via a combination of upgrading product quality, better processing and some functional upgrading, but also some downgrading (larger volume production of a basic product).
Cotton-to-garments	<p>Cotton: in Zimbabwe, between the onset of liberalization in the mid-1990s and the early 2000s (when the political situation further deteriorated) cotton quality was preserved because a few dominant firms maintained quality grading and management, and appropriate input provision. In the United Republic of Tanzania, during the same period a large number of players came into the domestic buying market, quality control broke down, input provision collapsed and seeds from different regions were mixed up.</p> <p>Garments: some Mauritian firms attempted to upgrade to own-brand manufacturing (OBM) and failed. Other firms were more successful in concentrating parts of their production mix on longer runs of more basic products by opening plants in Madagascar while keeping higher value-added lines operating in Mauritius. This enabled them to offer a broader mix of products with a wider range of price points and lead times to a wider range of customers.</p>

Three general findings on upgrading arise from these experiences:

- That steep upgrading trajectories are indeed possible in Africa, both in global- and domestic-oriented chains.
- That the 'best' upgrading trajectories are not necessarily the ones where the aim is to obtain the highest value added.
- That often optimal outcomes arise from a mix of both upgrading into higher value

added products or functions and at the same time maintaining or expanding lower value added but high volume products or functions.

Despite these generally positive outcomes, serious limitations arise both in relation to upgrading outcomes and to further upgrading possibilities, as shown in Table 4.6. The kinds of threats, risks and vulnerability that participants face are specific and contingent to the value chains in which they operate. They are linked also to the governance structure of these chains. In some highly driven chains, most threats arise from the increasingly challenging demands placed on African suppliers by large retailers (FFVs, furniture, wine, garments) or even displacement of producers by foreign investors (pineapples, biofuels).

In contrast, participants in non-driven chains face different kinds of problems: threats from resource depletion as a result of success in exporting (fish); lack of further support for upgrading and even subsidy policies that work actively against it (cassava); difficulties in overcoming older approaches to upgrading (dairy); and difficulties in maintaining quality and providing inputs in liberalized markets (cotton). Participants in the organic value chains seem to be the least vulnerable, and they are certainly less so than those selling in the mainstream coffee and cocoa markets.

The seven key lessons arising from the case studies relevant for agribusiness policy framework to guide upgrading are presented in the following paragraphs.

Standards can be a launching pad for inclusive upgrading

The experiences in the fish, FFVs, organics, and wine cases suggest that stricter food safety standards, sustainability certifications, quality and logistical specifications can provide the stimulus for dramatic upgrading trajectories in Africa—leading to improved products, processing and quality management. Although more stringent standards and buyer demands often entail new investment and higher private sector expenditure, the benefits of such investment can pay off.

In some cases, complying with standards pays off not only for large actors, but also for small ones (e.g. artisanal fishers, organic farmers). This is far from being automatic, however (case study on pineapple and potential problems of this nature in biofuels). Also, where this has happened, as in organic certification, higher profitability for certified farmers than for non-certified ones has been dependent on the organization of certified organic production in contract farming schemes. It is the specific design features, rather than contract farming in general, that can generate welfare improvements among organic smallholders. These observations suggest that industrial policy has to pay specific attention to standards and to specific and inclusive mechanisms of support for local industries to conform to such standards.

Private-public cooperation, industry associations and regulation are crucial

The fish case study suggests that without private-public cooperation and a strong industry association, the challenges of EU food safety would not have been solved. The same applies to the cotton case study, where responses to quality management problems following market liberalization were successful only in Zimbabwe, where

the local industry was in the hands of few players who were able to reorganize quality control and input provision. In other words, successful responses to immediate crises need to involve both regulators and industry actors, sometimes with the support of donors. This also applies when the challenges arise from the sustainability of natural resource extraction (fish and potentially biofuels in the future).

Value Chain Participant Councils (VCPCs) (chapter 3) can be a useful tool to facilitate the prioritization of upgrading trajectories, coupled with government interventions that do not push in opposite directions (see cassava case study). Yet, if economic incentives to key stakeholders are missing (as in the case of furniture in South Africa) even the best-designed private-public cooperation initiative is doomed to failure. Finally, the FFV case study suggests that where there is strong learning from global buyers taking place, the best thing governments can do is to stay out of the way.

First-mover advantage is important

The organic coffee and cocoa study shows that first-mover advantage is important in establishing the credentials of a country in new value chains, or in value chains where product definition is changing (this is emerging in biofuels as well). Such first-mover advantage can be built without waiting for governments to line up their (slow) support. Targeted donor support can make a difference, but what is especially important is to set up a flexible industrial policy framework that allows for quick responses and proactive, not only reactive, initiatives.

High risk and vulnerability in global value chains

Engagement in global value chains can result in steep upgrading trajectories and substantial financial gains, at least at the beginning of the process. At the same time, risk and vulnerability often increase. In time, price pressures from global buyers combined with changing requirements or consumer preferences and increasing demands on logistics, lead times and payment terms can quickly erode or challenge an established position in a value chain (see case studies on pineapple, wine, garments). Local value chain development can be an alternative to decreasing returns in export-oriented value chains (as in biofuels when oil prices are low), but stimulating local demand is not necessarily easy and/or the returns arising from local sales less attractive (e.g. FFV, pineapple, wine, furniture).

Mixing upgrading and downgrading strategies is important

Because global value chains (especially buyer-driven ones) expose local actors in Africa to higher risk and vulnerability, it is important to establish the right mix of upgrading and downgrading options; e.g. the furniture case study (South Africa) shows that getting stuck at the bottom end of the quality ladder does not pay in the long term. Both the garment study in Mauritius and the wine study in South Africa suggest that improved product quality, better processes and some functional upgrading can coexist with downgrading demands for higher volume of basic quality products. In certain value chains, it is important to cater for a variety of qualities rather than higher quality *per se*.

Value Chain ‘Regrading’

The importance of value chain upgrading must not obscure the growing significance of value chain restructuring and regrading. As the drivers of global demand are set to shift from northern to southern economies—sometimes referred to as ‘shifting wealth’ syndrome (OECD 2010a)—there are four main implications for global value chains (Kaplinsky *et al.* 2010)

- The combination of low *per capita* incomes and rapid urbanization in fast-growth emerging markets (especially, but not exclusively, in Asia) has increased demand for both hard and soft commodities, for food as well as inputs for infrastructure projects.
- Because *per capita* incomes are lower in emerging than in OECD markets, demand is shifting towards cheaper, undifferentiated ‘commoditized’ products in contrast to final demand in richer economies for ‘high quality, positional products’ (Kaplinsky *et al.* 2010, p.21)
- Consumer demand standards are likely to be lower for value chains serving emerging markets, in respect of both products and processes.
- While northern and southern economies often have complementary economic structures, growing South-South trade is often between countries with similar patterns of production and consumption, leading to intensified competition in the division of labour.

Kaplinsky *et al.* (2010) cite evidence from two developing country value chains—cassava in Thailand and timber in Gabon—for which the market has shifted from the EU to China resulting in reduced value added within the chain, as well as reduced importance in both process and product standards. Cassava and timber are relatively undifferentiated products with low levels of value chain coordination and governance, but the researchers believe that the ‘shifting wealth’ syndrome is likely to have a similar, possibly more pronounced, impact for less commoditized and more sophisticated value chains.

The lesson is an obvious one: when demand shifts, the impact is felt along the value chain and if the shifting wealth projections of the OECD (2010a) do materialize, then agribusiness value chains will have to adapt to market conditions. Accordingly, the current focus on value chain upgrading may shift to ‘regrading’ or even ‘downgrading’.

Kaplinsky *et al.* (2010) notes three positive aspects of this potential shift: first, the fact that processes and products for low-income demand are often labour-intensive and secondly, the skill, technology and managerial expertise levels of low-income value chains is likely to be a better ‘fit’ to the resource endowments of emerging economies and especially for SMEs. Thirdly, low-income markets, such as China, are less standards-intensive, as a result of which market access is easier and cheaper. For timber exports to the EU, however, Gabonese producers face much more rigorous standards than in the Chinese market. Overall, private standards stipulated by buyers and mandatory standards set by official bodies are much stricter in the EU (Terheggen 2010).

Certification costs can be burdensome. In the Gabonese timber industry, one large producer put the cost of certification at €4m, with an annual cost of main-

taining accreditation of around €100,000, while another estimated environmental compliance costs at €2.10 per hectare for an estimated minimum economic forest-holding of 50,000 hectares (Kaplinsky 2010).

In the light of these considerations it may well be that African exporters will prioritize lower-income markets where accessibility is simpler and cheaper. In strategic management terms this would be tantamount to pursuing a 'cost-leadership' strategy, rather than an upgrading or 'differentiation' strategy targeting more sophisticated higher-income markets. Arguably, at least for the medium term, a cost-leadership approach will be better suited to Africa's pattern of resource endowment.

Different tools are needed for upgrading in local value chains

In some local value chains, upgrading interventions are approached in the same way as for global value chains. As a result, too much attention is paid to high standards and to value addition through sophisticated processes. Simpler upgrading possibilities for more basic products are overlooked even though they may represent the most important proportion of the market (e.g. raw milk in Kenya and Uganda). Upgrading in local value chains at times necessitates different instruments, and special focus needs to be paid to low-cost and accessible solutions. At the same time, the potential role that can be played by local buyers should not be overlooked either (see furniture case study in Kenya). Finally, special attention needs to be paid to the preferences of local communities—coercive methods and simple information campaigns are unlikely to work in the long term (see cassava case study).

An industrial policy framework to guide upgrading

The lessons provided above suggest that the outcomes of upgrading do not depend on a fixed set of features. In some cases, value addition through improved processing is the way to go. In others, however, it is value addition related to branding or labelling a product as 'sustainable' or from a particular geographic area that stimulates process upgrading. In some value chains, downgrading processes need to accompany more classic upgrading trajectories. Threats can come from global buyers or producers, but also from incoherent national policies and resistance to change in local consumer preferences. The implication is that industrial policy options for stimulating upgrading and facilitating market access are value chain-specific, end-market specific, and time-bound. One size does not fit all, and such diversity suggests the need for an industrial policy informed by a value chain strategic framework that can be used quickly, cheaply and effectively at the country and possibly regional levels.

African countries need industrial policy frameworks within which value chain analysis is carried out on an ongoing basis to delineate upgrading strategies, prioritize support and channel specific support measures. In the absence of coordination mechanisms, it is difficult for local participants to profit from first-mover advantage or, for example, to coordinate bulking of orders if new opportunities are volume-related. This requires the existence of both: (a) an overall industrial policy framework at the national level; and (b) specific value chain strategic fora examin-

ing the possible support measures for ongoing or planned initiatives. The proposal in chapter 3 to establish Value Chain Participant Councils should form the bedrock for such an industrial policy framework, and could integrate existing donor initiatives.

4.6. Conclusions

The transformation of agricultural raw materials into agro-industrial products depends increasingly on the capacity of African entrepreneurs to supply global, regional and national value chains with products matching specific standards, volume and packaging requirements, at particular times, and under strict logistics and time to market demands. Supplying global value chains can stimulate upgrading, technology transfer and public-private cooperation, especially when exacting import standards are required. Gains can also be made from higher value added or more advanced technology, while in other cases they emanate from increased economies of scale or improved managerial capacity and logistics. Poorly-designed participation, the absence of clear strategies and external shocks can result in negative outcomes. Supplying regional and local value chains may also foster upgrading, usually with less steep learning curves and more limited outcomes, but also with less exposure to risk and vulnerability. Lessons from ten case studies of agro-food and agro-industrial value chain upgrading by African workers, producers, traders and processors, reveals some key lessons for policymakers in terms of how, where and when participation in value chains facilitates market access and fosters upgrading in African countries.

5. Exploiting local, regional and international demand

Timothy O. Williams

5.1. Introduction

Despite agriculture's importance to the African economy, the continent's share of global agricultural exports has shrunk from 3.2 per cent in 2000 to 2.8 per cent in 2008 (WTO 2009 p.46) and the region's progress in diversifying from bulk agricultural exports towards processed, higher-value and quality-differentiated products has been disappointing. Low-value primary commodities still account for a significant proportion of total exports. Yet profound changes in domestic, regional and international markets are creating new opportunities for trade in value added agricultural products and for agribusiness. These changes, driven by rising incomes, faster urbanization, trade liberalization, foreign and domestic investment and technological advances are increasing demand for high-value commodities, processed foods and agro-industrial products.

In general, trade growth increases with technology intensity (UNIDO 2002). But the bulk of Africa's trade growth in recent years has been driven by commodity exports, especially oil, with little evidence that the continent's exporters are moving upmarket into more high-technology activities. Although the growth in trade and investment links with China, India and other emerging economies over the last decade represent another potentially significant opportunity for the expansion of Africa's agro-industrial exports and agribusiness, here too the main focus has been the export of raw materials for further processing in Asia and elsewhere.

While long-term projections suggest that global growth in demand for agricultural products will be weaker than what was experienced before the 2008 economic downturn, World Bank forecasts suggest that three quarters of global demand for food between now and 2030 will emanate from developing countries (World Bank 2009b). This implies that regional and domestic markets in developing countries, in addition to global markets, will continue to offer growing opportunities for African food and agro-industrial products. Exploiting these opportunities will be crucial if African countries are to meet the growth and poverty reduction targets under CAADP and the MDGs.

This chapter examines the emerging opportunities and challenges for Africa in the markets for agro-industrial products in order to draw lessons for use in the design of future strategies. Following the overview, the second section examines the evolution of global trade in agro-industrial products over the past two decades, with particular attention to commodity-specific trends and Africa's performance. Section three highlights the factors and policies, including trade regimes and regional integration efforts, that are influencing Africa's trade performance, while the opportunities for the expansion of agro-industrial exports arising from the structural transformation of domestic and regional markets and the rapid growth of South-South trade are analysed in the fourth section. The fifth section reviews the experiences of Asian and Latin American countries that have successfully used trade as a key driver of growth, while section six outlines a strategy to promote the competitiveness of African countries in agro-industrial products trade. The concluding section argues that, with the continuing relevance of the agricultural sector in Africa, policies to promote agribusiness and agro-industrial products trade and competitiveness must be at the centre of growth strategies for the continent.

5.2. Trade in agro-industrial products and intermediate inputs

Agro-industrial products data set

Agro-industrial exports including food and live animals, beverages and tobacco, horticulture, textiles, leather, rubber and wood and cork products are divided into four broad categories following the methodology developed by UNIDO (1979) which distinguishes between various processing stages as follows: (a) unprocessed commodities exported for processing; (b) semi-processed commodities/products exported for further processing; (c) unprocessed commodities exported for final use; and (d) processed commodities/products exported for final use²⁹. A fifth category comprising only horticultural commodities—fruit, vegetables, spices and cut flowers—was added in recognition of the significance and growth of the horticulture sector in many African countries.

All trade statistics presented are derived from the United Nations Commodity Trade Statistics Database (UN COMTRADE; UNCTAD 2010a). Products are

29. The technological intensity classification that groups manufactured products into resource-based, low-technology, medium-technology and high-technology exports (UNIDO et al. 2009) was considered less appropriate for the purpose of this chapter since agro-industrial products are mainly found in two (resource-based and low-technology) out of the four categories.

grouped into the five categories above using the Standard International Trade Classification (SITC), Revision 1. Although this is not the latest classification system, it has the largest coverage of data submitted to the United Nations by African countries. A number of features of the trade data used should be noted. First, the limited availability of data for many sub-Saharan African countries, particularly in the 1990s due to lack of regular reporting of trade statistics, prompted the use of 'mirror trade data' (i.e. imports from all partner countries) as a proxy for Africa's exports. Secondly, aggregate EU trade data covers EU-15 only (i.e. members before 2004) in order to be consistent throughout the period covered (1990-2008). Finally, trade data reported below for regional groups (such as Asia, EU and Latin America and the Caribbean) exclude intra-regional trade.

Intermediate inputs data set

Trade in seven intermediate inputs important for agro-industry and agribusiness is considered in the analysis below. The seven inputs are:

- 1) Agricultural machinery used for soil preparation, harvesting and threshing
- 2) Fertilizers
- 3) Insecticides, fungicides and herbicides
- 4) Agro-processing machinery
- 5) Packaging materials
- 6) Transport equipment
- 7) Telecommunications equipment

Trade statistics for these inputs are derived from the International Trade Centre's (ITC) Trade Map, which is based on UN COMTRADE statistics. Inputs are grouped into the seven categories above using the Harmonised System (HS, 1996 edition) which, unlike the SITC, classifies some industrial products (e.g. equipment and machinery) according to the sectors (e.g. agriculture, manufacturing etc.) in which they are used.

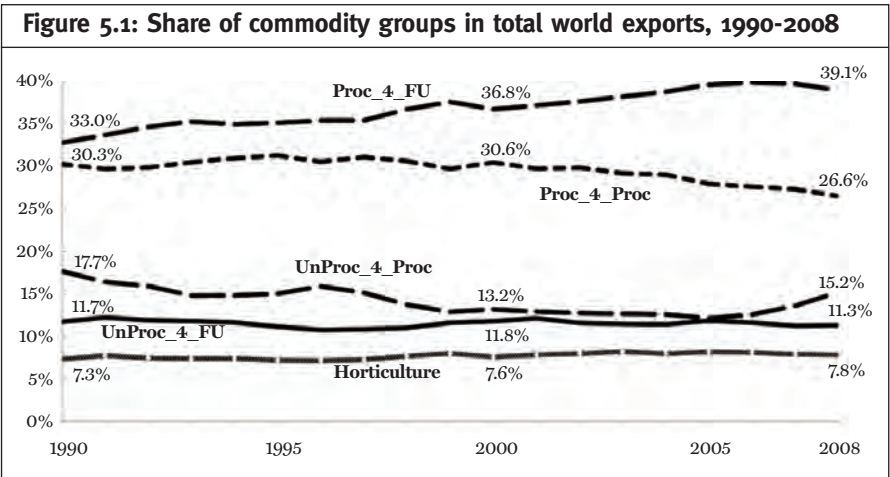
Patterns and trends in agro-industrial products trade

During the period 1990-2008, world agro-industrial exports increased more than three-fold from \$520 billion to \$1.66 trillion—an average annual compound growth rate of 6.7 per cent (Table 5.1). Over the same period, total world merchandise exports expanded almost five-fold from \$3.1 trillion to \$14.7 trillion, an average annual growth rate of 9 per cent. As a result, the share of agro-industrial exports in total merchandise exports fell from almost 17 per cent in 1990 to 11 per cent in 2008. The fastest growth rates were achieved by exports of processed commodities destined for final use (7.7 per cent a year) and horticulture (7 per cent a year), while unprocessed commodities exported for processing grew by 5.8 per cent annually.

Processed and semi-processed commodities constitute the vast bulk of world agro-industrial exports. Processed commodities destined for final use accounted for almost 40 per cent of total agro-industrial exports in 2008 (Figure 5.1). Processed commodities not only had the highest share of agro-industrial exports, but also had the fastest growth rate (Table 5.1). The share of semi-processed

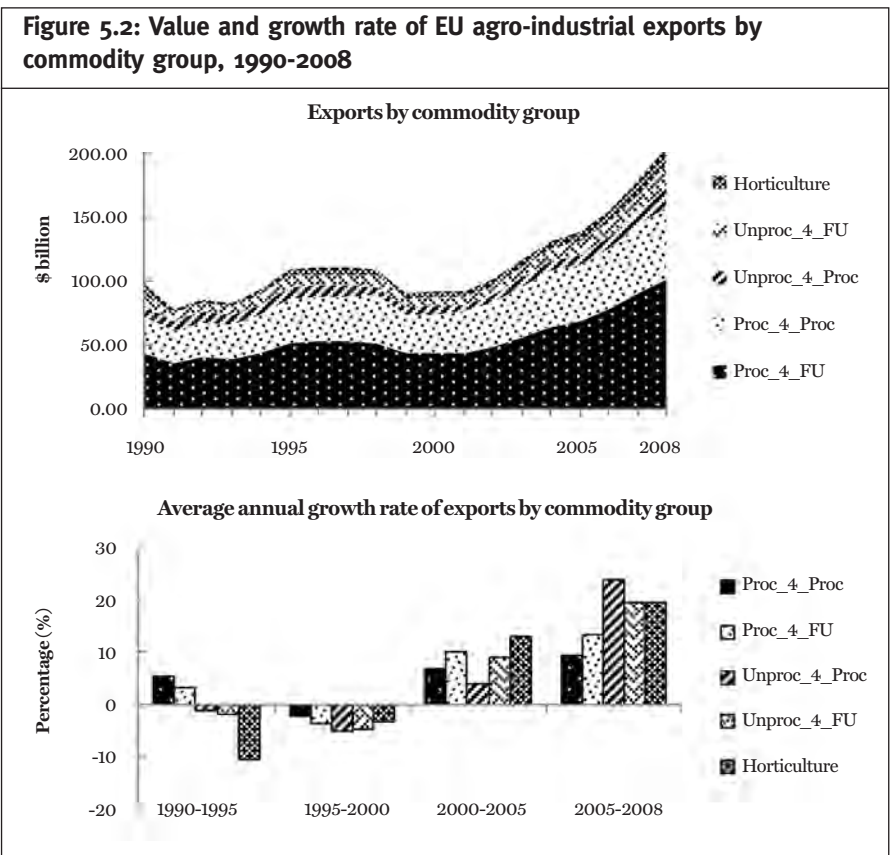
Table 5.1: World total merchandise and agro-industrial exports by commodity category, 1990-2008							
Year (\$ billion)	Total merchandise exports	Total agro-industrial exports	Processed commodities exported for final use	Semi-processed commodities exported for processing	Unprocessed commodities exported for processing	Unprocessed commodities exported for final use	Horticulture
1990	3,136.3	520.4	171.1	157.9	92.2	61.1	38.1
1991	3,196.4	532.3	179.8	158.5	87.5	65.2	41.2
1992	3,482.5	588.3	204.4	176.2	93.8	70.1	43.8
1993	3,458.5	569.1	201.4	174.0	84.4	67.3	42.0
1994	3,936.8	644.7	226.0	200.3	95.7	75.1	47.6
1995	4,720.7	755.6	266.2	237.1	113.7	84.3	54.3
1996	5,012.7	790.2	280.7	242.1	125.8	85.2	56.4
1997	5,200.7	793.9	282.0	247.7	120.3	86.2	57.6
1998	5,165.9	755.0	278.1	231.9	103.8	83.2	58.0
1999	5,374.2	737.7	278.1	219.7	95.3	85.7	58.9
2000	6,123.4	745.6	274.7	227.9	98.5	88.0	56.6
2001	5,918.0	750.3	279.7	223.7	97.0	91.2	58.6
2002	6,174.3	793.2	299.5	237.4	101.2	91.9	63.2
2003	7,180.0	915.7	351.0	268.0	116.1	105.1	75.4
2004	8,700.9	1,049.8	408.3	305.6	132.3	120.0	83.6
2005	9,928.8	1,131.9	450.0	317.2	137.6	134.3	92.9
2006	11,439.1	1,249.8	499.7	345.9	157.3	145.3	101.4
2007	13,163.1	1,456.7	580.4	399.0	198.4	164.0	114.8
2008	14,678.8	1,657.3	647.7	440.4	252.3	187.4	129.5
Average annual growth rate (%) 1990-2008	9.0	6.7	7.7	5.9	5.8	6.4	7.0

Source: UNCTAD (2010a)



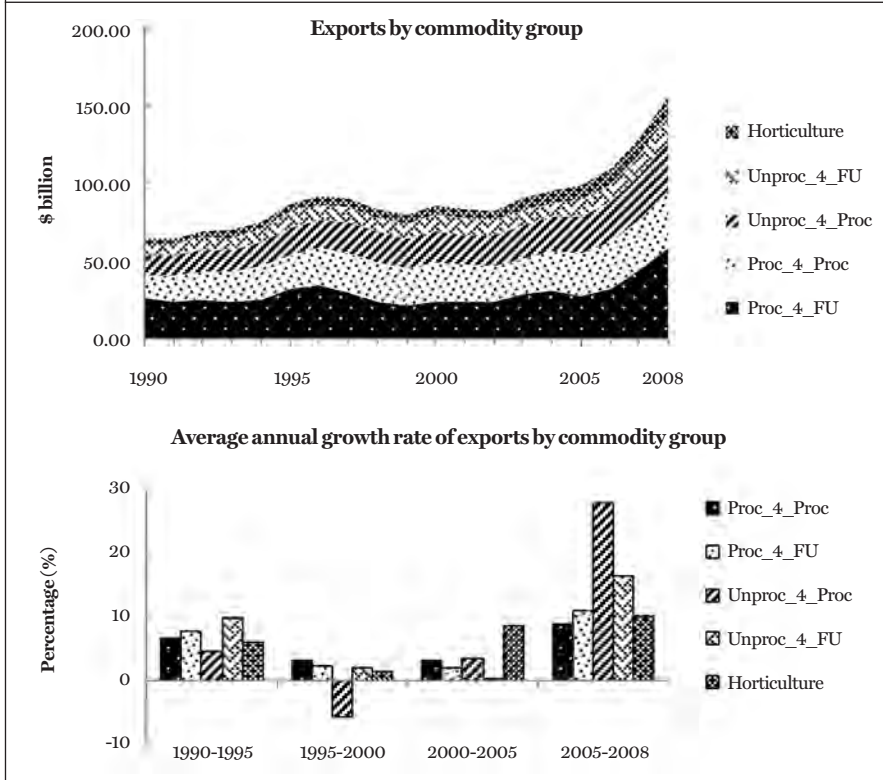
Source: UNCTAD (2010a)

Note: Proc_4_FU - Processed commodities exported for final use, Proc_4_Proc - Semi-processed commodities exported for processing, Unproc_4_Proc - Unprocessed commodities exported for processing, Unproc_4_FU - Unprocessed commodities exported for final use



Source: UNCTAD (2010a)

Figure 5.3: Value and growth rate of USA agro-industrial exports by commodity group, 1990-2008



Source: UNCTAD (2010a)

commodities exported for further processing declined slightly from 30 per cent in 1990 to about 27 in 2008. Taken together, trade in processed and semi-processed commodities accounted for two thirds of global agro-industrial exports in 2008.

The value and rate of growth of exports of different agro-industrial commodities by major regional groups and countries are shown in Figure 5.2 to Figure 5.5. The EU and Asia dominate processed and semi-processed commodities exports with a total of \$165 billion and \$157.2 billion in 2008, respectively. The world's top exporter of unprocessed commodities destined for processing is the US, with total exports worth \$58.6 billion in 2008, followed by Latin America and the Caribbean with exports worth approximately \$37 billion in the same year. During the period 2005-2008, exports of unprocessed commodities destined for processing grew faster than exports of other commodity groups in all the three regions and the US, partly reflecting the hike in food prices that occurred during this period.

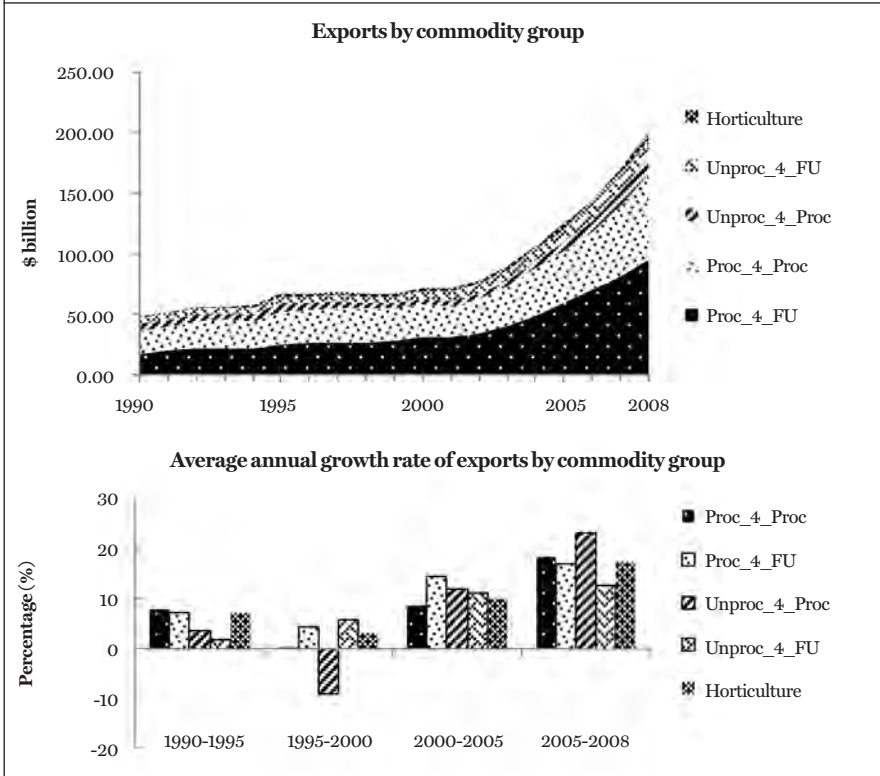
As noted earlier, 'mirror trade data' (i.e. imports from all partner countries worldwide) were used as a proxy to analyse the export performance of African countries in agro-industrial products trade. Since UN COMTRADE captures 95 per cent

Table 5.2: World total merchandise and agro-industrial imports from Africa by commodity category¹, 1990-2008

Year (\$billion)	Total merchandise exports	Total agro-industrial exports	Processed commodities exported for final use	Semi-processed commodities exported for processing	Unprocessed commodities exported for processing	Unprocessed commodities exported for final use	Horticulture
1990	81.9	14.4	1.6	2.7	6.5	2.2	1.6
1991	76.7	13.9	1.7	2.4	6.0	2.2	1.8
1992	76.4	13.9	1.6	2.5	5.9	2.2	1.8
1993	68.4	13.5	1.5	2.3	5.8	2.1	1.8
1994	71.7	16.5	1.9	3.2	7.5	2.1	1.9
1995	83.6	20.3	2.5	3.5	9.3	2.9	2.2
1996	96.9	21.0	2.7	3.4	9.6	2.9	2.4
1997	97.7	20.9	2.7	3.5	9.8	2.8	2.2
1998	83.4	21.2	2.8	3.6	9.6	2.8	2.3
1999	87.6	19.9	2.8	3.0	8.7	2.8	2.6
2000	149.7	24.7	4.3	4.4	8.3	3.9	3.8
2001	146.9	25.7	4.6	4.9	8.0	4.1	4.1
2002	148.0	27.3	5.0	5.2	8.4	4.2	4.5
2003	182.3	32.3	6.1	5.9	10.4	4.3	5.6
2004	237.6	35.9	7.5	6.5	11.2	4.5	6.4
2005	301.9	37.4	7.6	6.5	11.6	4.8	6.9
2006	371.8	39.1	8.4	6.6	12.2	4.9	7.1
2007	430.8	46.4	10.0	7.7	14.3	5.4	9.1
2008	563.5	50.7	10.1	9.1	15.7	5.8	10.0
Average annual growth rate (%) 1990-2008	11.3	7.2	10.8	7.0	5.0	5.5	10.7

Source: UNCTAD (2010a) + Data include intra-African trade.

Figure 5.4: Value and growth rate of Asia agro-industrial exports by commodity group, 1990-2008



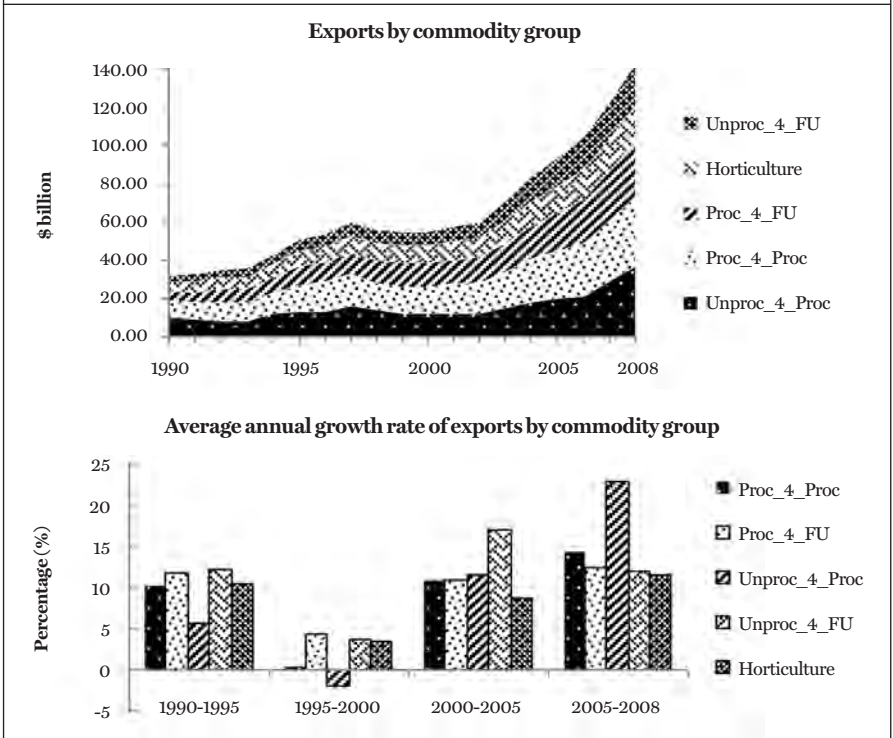
Source: UNCTAD (2010a)

of world trade, mirror trade statistics usually give fairly reliable results³⁰. A number of salient features emerge from this analysis.

- Table 5.2 shows Africa’s agro-industrial exports increasing from about \$14 billion in 1990 to \$51 billion by 2008—an average annual compound growth rate of 7.2 per cent. Despite this, the region’s world market share of agro-industrial merchandise imports fell by half from 18 per cent to 9 per cent, partly reflecting the increasing importance of non-agricultural products, especially oil and other mineral commodities.
- Trade in horticulture and processed commodities exported for final use grew faster than total agro-industrial exports, albeit from a low base. These commodities grew annually at 10.7 per cent and 10.8 per cent, respectively, compared with only 7.2 per cent for total agro-industrial exports and 5.0 per cent for unprocessed commodities exported for processing.

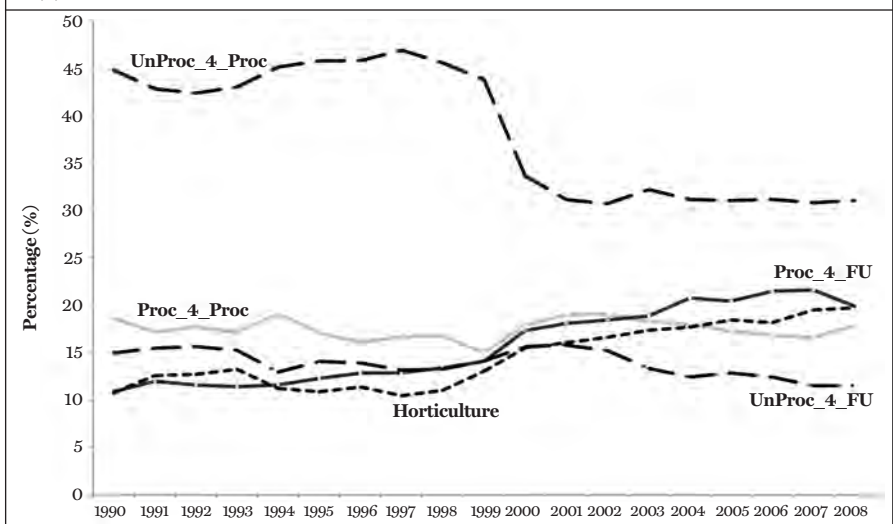
30. Two shortcomings of mirror trade data should, however, be noted. First, they do not cover trade with other non-reporting countries. As a result, they may not adequately capture the totality of South-South trade. Secondly, mirror statistics invert the reporting standards by valuing exports in cost, insurance and freight (CIF) terms. Thus, using mirror statistics as a proxy for African exports will necessarily inflate the value of their trade since partner country imports will be valued on the basis of CIF—in contrast to the normal practice of valuing exports on free on board (FOB) basis.

Figure 5.5: Value and growth rate of Latin America & Caribbean agro-industrial exports by commodity group, 1990-2008



Source: UNCTAD (2010a)

Figure 5.6: Share of commodity groups in total world imports from Africa, 1990-2008



Source: UNCTAD (2010a)

- In part this faster export growth for horticulture and processed commodities reflects the global shift in the commodity composition of agro-industrial trade. As Figure 5.6 shows, unprocessed raw materials exported for processing constituted about 45 per cent of world agro-industrial imports from Africa in 1990, declining to 31 per cent by 2008. Over the same period, the share of horticulture nearly doubled from 11 to 20 per cent, while the share of processed commodities exported for final use increased from 11 to 20 per cent of world agro-industrial imports from Africa. The share of semi-processed commodities in world agro-industrial imports from Africa has fluctuated between 18 and 19 per cent since 1990. Despite this gradual shift in export commodity composition, however, a comparison of Figure 5.6 and Figure 5.1 shows clearly that world agro-industrial imports from Africa are still dominated by unprocessed and horticultural commodities, in sharp contrast with the commodity composition of global agro-industrial exports.
- Table 5.3 shows the relative importance of intra-African trade in agro-industrial products. Total intra-African agro-industrial imports increased from less than a billion dollars in 1990 to nearly \$8 billion by 2008, with an average annual compound growth rate of 14.2 per cent. Intra-African agro-industrial imports represented only 5 per cent of world imports of agro-industrial products from Africa in 1990 but increased to 15 per cent by 2008. Although starting from a low base, the fastest growth in intra-African imports were achieved for processed commodities destined for final use (19.8 per cent a year), semi-processed commodities destined for further processing (18.7 per cent a year) and horticulture products (15.5 per cent a year). Unprocessed commodities imported for processing grew by 9.7 per cent annually.
- While the annual value of intra-African trade in agro-industrial products is still relatively small, the data in Table 5.3 suggest that a shift towards trade in processed, semi-processed and horticulture products has been steadily occurring over the last two decades. If it is borne in mind that informal trade in agro-industrial products which OECD surveys has been shown to be quite substantial (but is not captured in the data in Table 5.3 as UN Comtrade only captures reported formal trade data), then it would appear that with appropriate policies the regional market can serve as a platform for expanded diversified trade in agro-industrial products and agribusiness.

Market share and growth

Analysis of trends in export value and market share for individual countries and specific products largely confirm the continent-wide results presented above. Annex 2 to Annex 5 show the leading 25 exporting countries and their market shares for food, textiles, wood and cork and leather products at different stages of processing. As Annex 2 Panel A indicates, in the 1990–95 period, no African country was among the top 25 exporting countries of unprocessed food. However, during the 2003–08 period, two African countries featured on the list—Côte d’Ivoire in twelfth position with annual average exports of \$1.8 billion and a global market share of 1.6 per cent, and Ghana in twenty-fifth

Table 5.3: Total Intra-African merchandise and agro-industrial imports by commodity category, 1990-2008

Year (\$billion)	Total merchandise exports	Total agro-industrial exports	Processed commodities exported for final use	Semi-processed commodities exported for processing	Unprocessed commodities exported for processing	Unprocessed commodities exported for final use	Horticulture
1990	2.0	0.7	0.1	0.1	0.3	0.1	0.03
1991	1.9	0.7	0.1	0.2	0.3	0.1	0.05
1992	2.2	0.6	0.1	0.1	0.2	0.1	0.02
1993	1.7	0.6	0.1	0.1	0.2	0.1	0.02
1994	2.3	0.8	0.2	0.2	0.3	0.1	0.02
1995	4.0	1.1	0.2	0.2	0.4	0.2	0.04
1996	5.2	1.3	0.3	0.2	0.5	0.3	0.1
1997	5.7	1.6	0.3	0.3	0.6	0.3	0.1
1998	5.0	1.6	0.4	0.3	0.6	0.3	0.1
1999	4.8	1.3	0.3	0.3	0.4	0.3	0.1
2000	13.4	3.1	1.1	0.6	0.8	0.5	0.2
2001	15.2	3.7	1.3	0.8	0.9	0.6	0.2
2002	17.5	4.1	1.4	0.9	0.9	0.6	0.2
2003	20.2	4.6	1.7	1.2	1.0	0.6	0.2
2004	24.2	5.1	1.9	1.2	1.2	0.5	0.3
2005	28.3	4.9	1.9	1.0	1.1	0.6	0.2
2006	32.3	5.3	2.0	1.0	1.2	0.7	0.3
2007	37.8	6.7	2.9	1.4	1.4	0.7	0.3
2008	47.0	7.7	2.6	2.2	1.6	0.9	0.4
Average annual growth rate (%) 1990-2008	19.2	14.2	19.8	18.7	9.7	13.0	15.5

Source: UNCTAD (2010a)

position with annual average exports of \$800 million and a global market share of 0.7 per cent. For semi-processed food, Mauritius, in twenty-fourth position with an annual average export of \$400 million (global market share of 0.9 per cent), was Africa's largest exporter over the period 1990-95 (Annex 2 Panel B). By 2003-08, Côte d'Ivoire, in twenty-fifth position with an annual average export of \$600 million (global market share of 0.6 per cent), was the largest exporter of semi-processed food from Africa followed by South Africa with export of \$400 million (global market share of 0.4 per cent) and Mauritius with export of \$340 million (global market share of 0.3 per cent) in thirty-fourth and thirty-sixth position, respectively. None of the African countries was among the leading 25 exporting countries of processed food in the two periods covered.

Similarly as Annex 3 shows, two African countries—Egypt and Benin—and the Southern African Customs Union (SACU) featured on the list of 25 leading exporters of unprocessed textiles raw materials in the 1990-95 period. By 2003-08, five African countries featured on the list—Mali and Egypt jointly in eleventh position with an annual average export of \$300 million and global market share of 1.7 per cent each, South Africa in twenty-first position with an annual average export of \$140 million (global market share of 0.9 per cent), and Côte d'Ivoire and Burkina Faso with an average export of \$130 million and market share of 0.8 per cent each in joint twenty-fourth position. However, no African country was among the leading 25 exporting countries of semi-processed and processed textiles during the two periods covered.

For horticultural products during the period 2003-08, South Africa with an average export of \$1.4 billion and market share of 1.4 per cent, and Morocco with average export of \$800 million and market share of 0.8 per cent, featured on the list of 25 leading exporters (Annex 4).

The results for leather products are similar, with one or two African countries on the list of top exporters of unprocessed, semi-processed and processed leather products (South Africa, Nigeria, Tunisia and Morocco) (Annex 5).

In summary, the overall picture that emerges is that while there has been some expansion in agro-industrial exports in a number of African countries, much of the increase has been in the export of unprocessed commodities. Furthermore, the share of global exports held by these countries has remained fairly small, while for other countries their shares have been falling. This indicates that African countries have not yet managed to adjust the composition of their agro-industrial exports to fit the changing patterns of world demand, which as discussed above, has shifted towards processed and semi-processed commodities. This observation is further corroborated by an examination of the Trade Performance Index—a sectoral benchmarking tool of export performance and competitiveness developed by the International Trade Centre (ITC)—for African countries and the products considered here. This examination shows that the inability of many African countries to tap into the most dynamic market segments of the global agro-industrial products trade is partly due to lack of competitiveness and partly as a result of inability to adapt export supply to changes in world demand.

Patterns and trends in intermediate inputs trade

Agricultural inputs such as fertilizers, plant health protection products and soil preparation machinery are essential for increased agricultural productivity. Although some exports of these inputs occur (e.g. fertilizers mainly by Tunisia and Morocco and agricultural machinery mainly by South Africa), Africa as a whole is a net importer of these intermediate inputs (Annex 6 to Annex 8). Africa's share in global imports of fertilizers, at 4.8 per cent, and plant health protection products, at 5 per cent in 2008, is low compared with the share of imports of other developing regions of Asia (33.2 per cent for fertilizers and 12.4 per cent for plant health protection products) and Latin America and the Caribbean (19.8 per cent for fertilizers and 17.2 per cent for plant protection products). Given the net-importing position of Africa, this low level of imports translates into low-level utilization of these inputs on a per hectare basis, as will be shown in the next section. Africa's share in global imports of soil preparation, harvesting and threshing machinery, at 4.4 per cent in 2008, is, however, comparable to the share of imports of Asia (at 4.2 per cent) and Latin America and the Caribbean (at 6 per cent), even though these two regions are next exporters of this type of agricultural machinery.

Also, Africa remains a net importer of other intermediate inputs such as agro-processing machinery; packaging materials and transport and telecommunications equipment that are important for value addition, improved product quality and transport and trade logistics facilitation (Annex 9 to Annex 12). Furthermore, Africa's share in the global export and import of these inputs lags behind the share of other regions. Africa's trade with emerging economies in these inputs is increasing.

5.3. Factors shaping Africa's international trade patterns

Three main factors have influenced the evolution of Africa's agro-industrial exports:

- Domestic macroeconomic, sectoral and trade policies
- Supply-side constraints
- Policies of other countries and external trade regimes

Domestic macroeconomic, sectoral and trade policies

There is considerable evidence that many African governments in the 1960s and 1970s implemented macroeconomic, sectoral and trade policies that hindered the growth of agricultural production and exports (Oyejide 1986; Krueger *et al.* 1988; Krueger *et al.* 1991; Williams 1993; Thiele 2002; Anderson & Masters 2009). These government-imposed distortions, manifested in over-valued exchange rates, high tariff protection of industry, price controls and taxes on agricultural exports, created an anti-export bias.

Since the 1980s, a significant number of African countries have made substantial progress in improving macroeconomic conditions and reducing anti-export bias created by high tariffs. These changes have resulted in a positive but limited export response (Table 5.2), especially in expanding total exports and in increasing slightly the share of processed and semi-processed commodities in agro-industrial exports. But many distortions still remain, so that while average tariff rates have declined substantially, various levies e.g. value added tax (VAT) and surcharges on imported

and locally-produced intermediate inputs into agricultural production and processing have been introduced. Countries have attempted to compensate for this remaining anti-export bias by establishing a regime of offsetting measures, including duty concessions and exemptions, duty drawbacks and VAT rebates, export processing zones (EPZs) and special economic zones (SEZs), to create favourable conditions for exporters and foreign investors.

The World Bank's Diagnostic Trade Integration Studies (DTISs) show, however, that many countries lack the institutional capacity to effectively implement such offsetting measures. Additionally, the DTISs show that government institutions involved in formulating and implementing trade policy, promoting trade and providing trade support services are functioning poorly, suggesting that the impact of trade liberalization on export development and diversification is being undercut by poor trade policy implementation (Biggs 2007).

Supply-side constraints

In addition to ongoing trade-reducing policy distortions, the ability of entrepreneurs to expand and diversify agro-industrial exports has been curtailed by binding constraints on the supply side. Leaving aside deeper constraints such as geography and location, the key supply-side barriers that have been reported in various studies, and analysed in other chapters of this book, include:

- Low productivity due to poor agronomic practices and inadequate utilization of yield-augmenting intermediate inputs. In addition, inefficient production and processing technologies, management practices and organizational structures also contribute to low productivity. These constraints are a manifestation of underinvestment in research and development and weak institutions, which are unable to disseminate new technologies and other inputs widely (chapters 3 and 6).
- Low capacity utilization due to inadequate working capital, irregular supply of raw materials and problems of the private sector adjusting to policy changes (chapter 8).
- Poor infrastructure (roads, electricity, telecommunications and water) (chapter 9). Not only is infrastructure inadequate, but the prices charged for infrastructure services in Africa are very high by global standards (Annex 13 and Annex 14). High prices raise the cost of production and make exporters uncompetitive in international markets. In addition, supply of services is often unreliable despite the high prices charged. World Bank studies indicate that 52 per cent of firms in sub-Saharan Africa report unreliable electricity supply as a major constraint compared with 42 per cent in South Asia and 24 per cent in East Asia and Latin America (Hallward-Driemeier & Stewart 2004).
- Poor transport and trade logistics (chapter 9). Transport poses a serious bottleneck to commercialization of agriculture by limiting the ability to diversify into new exports such as horticulture, which require rapid delivery and refrigerated trucks to maintain quality and reduce spoilage. All forms of transportation in Africa—road, rail, sea and air—are relatively more expensive than in competitor countries (Portugal-Perez & Wilson 2008). Additionally, trade logistics problems increase the costs of exporting and create binding constraints for diversification as competitiveness in horticulture, semi-processed and processed commodities requires

timely delivery. Indeed, the existence of efficient transport and trade logistics backed by information and communication technology is considered a precondition in most modern value chains. Without these facilities, a country cannot operate a competitive value chain.

- Credit constraints (chapter 7). Limited access to credit for working capital and fixed capital investments constitutes a major impediment to productivity improvement and investment in new activities.
- Access to land. In many countries, insecure property rights, poor contract enforcement and stringent legal restrictions constrain the performance of land markets (chapter 3, 7).
- Poor business and investment environment (chapter 8). As Table 5.4 indicates, the indirect costs due to a poor business environment are higher on average in African countries than in their competitors in the developing world.
- Standards and technical regulations that cover health, safety and quality requirements have become important determinants of access to export markets and the lucrative segments of the domestic market (chapter 6). Despite this importance, there has been only limited success in developing comprehensive and sustainable standards and quality management capacity in many African countries (Biggs 2007). The inability of governments and the private sector to build and strengthen this limited capacity may hamper the development and export of new products or higher quality variants of existing exports.

Region	Starting a business			Taxes payable by businesses		Trade facilitation		
	Procedures (no.)	Duration (days)	Cost (% of per capita income)	Payments (no.)	Total tax rate (% of profit)	Lead time to export (days)	Documents required for export (no.)	Logistics Performance Index†
Sub-Saharan Africa	9	44	99.7	38	67.6	8.1	8	2.42
South Asia	7	28	27.0	31	40.0	1.9	9	2.49
Latin America & Caribbean	10	67	41.2	33	48.5	3.9	7	2.74
East Asia & Pacific	8	42	30.1	27	38.0	3.6	7	2.73
Euro Area	6	15	6.0	15	45.9	2.2	4	3.57

Source: World Bank (2010a) Note: † Logistics Performance Index: 1 to 5 (worst to best)

- Weak management capability (chapter 6). The DTISs show that poor management skills reduce the competitiveness of many agro-enterprises in Africa. Lack of planning, marketing and financial management skills effectively limit the ability of many entrepreneurs to plan future production, diversify production activities or develop strategies to target the right markets.

This brief summary of supply-side constraints reveals the principal barriers that must be tackled in order to improve Africa's agro-industrial products trade and competitiveness.

Policies of other countries and external trade regimes

In addition to the domestic policies of African countries, their agricultural sector and trade continue to be influenced by the farm, food and trade policies of other countries, particularly countries in the Organization for Economic Cooperation and Development (OECD). For decades, OECD countries have supported their farm sectors against competitors through tariffs, trade barriers and subsidies to domestic producers and exporters. Relatively little progress has been made in reforming the agricultural policies of these countries, which continue to impose substantial costs on African agriculture through their effects on world prices and the barriers

Table 5.5: MFN applied tariff rates and distribution of tariff lines and import shares by duty classes in the EU										
Agricultural products										
	Simple Average	Duty-free	0<=5	5<=10	10<=15	15<=25	25<=50	50<=100	>100	NAV (%)
Tariff lines and import value shares (%)										
MFN Applied, 2008	16.0	29.6	9.3	15.8	13.2	10.8	9.1	6.1	1.7	36.6
Share of imports		51.3	12.2	17.5	12.2	6.0	0.7	0.1	0.0	2.5
Notes: Number of MFN applied tariff lines (HS) is 2,797; NAV – Non-ad valorem duty										
Non-agricultural products										
	Simple Average	Duty-free	0<=5	5<=10	10<=15	15<=25	25<=50	50<=100	>100	NAV (%)
Tariff lines and import value shares (%)										
MFN Applied, 2008	4.0	26.2	38.8	27.2	6.7	1.1	0.0	0.0	0.0	0.7
Share of imports		53.2	27.2	12.6	6.2	0.8	0.0	0.0	0.0	0.4

Source: WTO *et al.* (2009) Note: Number of MFN applied tariff lines Harmonized System (HS) is 7,716

they pose to effective participation of African farmers in global agricultural trade. Latest OECD estimates indicate that OECD countries as a whole spent \$265 billion to support their agricultural producers in 2008 (OECD 2009b). This amount is more than twice the total net official development assistance (ODA) from members of the OECD Development Assistance Committee (DAC), which stood at \$87.0 billion in 2008, and almost seven times the net ODA to Africa that year, which amounted to \$27.3 billion (OECD 2009c).

Although agricultural tariffs have fallen, they remain relatively high. Table 5.5 and Table 5.6 show the simple average most favoured nation (MFN) applied tariff rates and the distribution of tariff lines and import shares by duty classes for agricultural and non-agricultural products in the EU and US, the two largest markets for African exports.

Five features stand out:

- 1) The simple average MFN tariff imposed on agricultural products by the EU in 2008 (16 per cent) was three times the rate imposed by the US (5.3 per cent).
- 2) Duty-free imports accounted for 30 per cent of all agricultural tariff lines in both the EU and the US in 2007.

Table 5.6: MFN applied tariff rates and distribution of tariff lines and import shares by duty classes in the US										
Agricultural products										
	Simple Average	Duty-free	0<=5	5<=10	10<=15	15<=25	25<=50	50<=100	>100	NAV (%)
Tariff lines and import value shares (%)										
MFN Applied, 2008	5.3	30.5	43.3	14.2	5.2	3.2	1.9	0.5	0.5	50.8
Share of imports		39.6	40.0	12.4	4.2	2.6	0.9	0.2	0.1	39.0
Notes: Number of MFN applied tariff lines (HS) is 1,596; NAV – Non-ad valorem duty										
Non-agricultural products										
	Simple Average	Duty-free	0<=5	5<=10	10<=15	15<=25	25<=50	50<=100	>100	NAV (%)
Tariff lines and import value shares (%)										
MFN Applied, 2008	3.3	47.5	26.7	17.0	4.8	1.9	0.5	0.0	0.0	3.1
Share of imports		49.1	39.0	6.7	0.8	3.6	0.7	0.0	0.0	15.1

Source: WTO *et al.* (2009)

Note: Number of MFN applied tariff lines (HS) is 9,390

5. Exploiting local, regional and international demand

- 3) Peak tariffs of more than 15 per cent covered almost 28 per cent of all agricultural tariff lines in the EU but only 6 per cent in the US.
- 4) Average tariffs on agricultural products were higher than those on non-agricultural products, and much more so in the EU. Furthermore, the share of lines with peak tariffs was much lower for non-agricultural products compared with agricultural commodities (1.1 per cent versus 27.7 per cent for EU, and 2.4 per cent versus 6.1 per cent for US).
- 5) Non ad-valorem tariffs were much more frequently imposed on agricultural products than non-agricultural commodities. McCalla and Nash (2007) showed that the high levels of tariffs on agricultural products understate the extent of protection in developed countries, where about 30 per cent of agricultural production is shielded by the application of non-tariff measures (NTMs) such as export subsidies, tariff rate quotas and tariff escalation, whereby tariffs increase with the degree of processing.

Table 5.7 illustrates tariff escalation on agricultural products in a number of OECD countries showing that in the EU in 2006, semi-processed and fully processed agricultural products attracted, respectively, twice and three times the level of tariff imposed on primary products. This barrier hinders product diversification and higher value-added export growth in African countries. Van Berkum (2009) shows that although the number of commodities attracting escalating tariffs is declining in the EU, tariff escalation is still prevalent in many commodity chains, particularly cocoa, tomatoes, palm oil, soya, leather and cotton.

On the positive side, a significant number of African countries benefit from preferential market access schemes, such as the Generalized System of Preferences (GSP), the Generalized System of Preferences for Least Developed Countries (GSP-LDC)—also known as the Everything but Arms (EBA) Agreement in the EU, the US Africa Growth and Opportunity Act (AGOA) and the EU’s Cotonou Agreement

Table 5.7: Tariff escalation in OECD member countries for agricultural products 2005-2006				
Country/Group	Tariff Year	Agricultural Products (HS 01 – 24) (unweighted average in %)		
		Primary	Semi-processed	Finished
Australia	2006	0.4	0.6	2.2
Canada	2006	1.6	3.2	6.3
EU-27	2006	3.6	7.1	10.8
Iceland	2006	3.9	9.2	7.7
Japan	2005	3.4	11.7	15.2
Rep. of Korea	2006	48.9	99.5	33.9
New Zealand	2005	0.5	2.4	3.1
Norway	2006	16.7	0.1	5.4
US	2005	6.9	4.4	9.9

Source: www.siteresources.worldbank.org/INTRES/Resources/469232.../tar2006c.xls

Note: Based on simple average of MFN applied tariffs. Product categories are defined by HS classification of agricultural products (01 – 24)

for African, Caribbean and Pacific (ACP) countries, which is being replaced by the Economic Partnership Agreements (EPAs). As a result of these schemes, African exporters face below-average tariff rates in the EU and US markets for certain products, while LDCs enjoy free market access to the EU.

However, as the discussion of African agro-industrial export patterns indicates, these schemes have not generated remarkable export growth. Brenton *et al.* (2008) suggest three reasons for this.

Firstly, preference margins for many products currently exported by African countries are typically small and will continue to be eroded by multilateral trade liberalization. For instance, they estimated that the value of ACP/GSP preferences for all African countries (excluding South Africa) equates to 2.6 per cent (3.3 per cent) of their respective exports. The value of EU preferences for African LDCs is even less at 2.1 per cent of their exports to the EU. Liapis (2007) indicated that the two leading beneficiaries of the EU's ACP scheme were Mauritius and Côte d'Ivoire, with an average annual value of preference margin of \$159 million and \$81 million respectively. The products that generated most of these added returns were sugar, bananas and tobacco. But the value of these benefits has fallen as the EU has reformed its domestic sugar policy and its banana import scheme.

Secondly, preferences have not addressed the key supply-side constraints, noted above, that limit access of African countries to all markets. Thirdly, for products with substantial preference margins such as clothing, market access had been severely reduced by restrictive rules of origin imposed by the EU, although these rules have now been relaxed under the interim EPAs that have been signed by a few regions.

There is some evidence, in support of this relaxation, which suggests that preferences can act as a catalyst for manufacturing exports if they are designed to allow import of complementary inputs and to operate in countries with sufficient skills and infrastructure (Collier & Venables 2007).

In summary, African countries need to build capacity to trade that would allow them to increase their supply response to preferences. At the same time, they will benefit from trade reforms that lead to the removal of the most distorting policies that hurt African agricultural trade.

5.4. Opportunities and challenges for expansion and diversification of trade

Profound changes in national, regional and international markets are creating a wide range of opportunities for expansion and diversification of agro-industrial products trade. Opportunities are emerging in these markets for new products, for improving the quality of currently traded commodities and for increasing the penetration of regional and international markets for existing exports.

An increasing proportion of global food and beverages (80 per cent) is undergoing processing, with 60 per cent being consumed in industrialized economies (Wilkinson & Rocha 2008). While households in developing countries spend a high proportion of total expenditures on food, most is in unprocessed form. Thus, while *per capita* retail sales of packaged food in industrialized countries were 15 times

higher than in developing countries, growth in consumption is much faster in developing countries: 7 per cent in upper middle, 28 per cent in lower middle and 13 per cent in low-income countries, compared with 2-3 per cent annually in industrialized countries during 1996-2002. Such rapid growth is expected to continue (UNIDO *et al.* 2008) due to:

- Growth in population and per capita consumption associated with changing diet, greater variety and improved quality of processed food products.
- Increased use of refrigerators and microwave ovens, which facilitate greater demand for perishable and frozen food and higher consumption of prepared food and ready-made meals.
- Greater internationalization of retail outlets, which influence shifts in consumer behaviour and patterns.
- Urbanization, which increases the importance of food preservation and convenience.
- Demographic changes involving increasing female participation in labour markets, ageing population associated with improvements in health, a growing middle class with high purchasing power in emerging economies, and growing importance of single-person households, which drive demand for ready-made meals, convenience food and food services.

Opportunities in domestic and regional markets

Analysis of supply and demand constraints suggests that, given geographic proximity, economic size and cultural affinity, African countries have a potential for increasing intra-African trade. However, realizing this potential and thus accelerating regional integration through intra-African trade is constrained, not only by lack of industrial diversification, as reflected in similarity of exports and imports among African countries, but also by the relatively strong competitive position of actual and potential international suppliers to Africa (UNECA *et al.* 2010). Analysis of revealed comparative advantage (RCA) shows that for African suppliers, RCA is less than half the level calculated for OECD countries, as well as China and India. In Africa, potential suppliers based on RCA are limited to a few countries such as South Africa, Egypt and Kenya; however, none of these enjoy comparative advantage with any of the current exporters to Africa. In all African countries identified as potential suppliers, the domestic price is higher than the corresponding import price of Africa's current trading partners. In other words, increasing international competition in African domestic markets is a real competitive threat to accelerating production and intra-African trade. In turn, this requires policy measures to overcome supply constraints, improve competitiveness and accelerate diversification of production and trade.

Yet, domestic and regional markets in Africa show some signs of being able to nurture the growth of African agro-industry, agribusiness and trade in the medium and long term. Domestic and regional markets offer the most promising opportunities for Africa's producers, agribusinesses and value chains (chapter 4; World Bank & FAO (2009)). Also, in Africa, demand for food is expected to reach \$100 billion by 2015, doubling its level of 2000 (Diao *et al.* 2003). Although demand for

staples will constitute a significant share of this increase, rising incomes, urbanization and changing consumer preferences are driving the demand for higher-value products, as well as semi-processed and processed commodities and convenience foods. These trends have propelled the entry and rapid growth of supermarket chains and agro-industrial processing and food service industries in domestic and regional markets.

There is some evidence that higher-value markets catering for domestic consumption are the fastest growing markets in many African countries. Neven & Reardon (2004) reported that supermarkets in Kenya, beginning in the mid-1990s, grew at 18 per cent annually and had a share of one-fifth of the overall food market in cities. In South Africa, the share of supermarkets in national food retail was 55 per cent in the early 2000s (Weatherspoon & Reardon 2003). This growth has been partly due to the significant investment by multinational corporations (MNCs), either directly or through non-equity linkages such as franchises and licensing. But foreign MNCs are not the only players in the agro-food/agro-processing chains. African agribusiness companies have emerged to play an active role in shaping markets and value chains, particularly in Southern, West and North Africa. The larger African companies have started to operate beyond their national borders in order to seek opportunities abroad within the continent (OECD 2008). SAB Miller, a South African beverage company, has brewing and bottling facilities across many countries in Southern Africa. Illovo Sugar, another South African company, has operations in Malawi, Mozambique, Swaziland, the United Republic of Tanzania and Zambia and will soon expand to Mali. A few African companies also have international operations outside the continent. SAB Miller has established its brands across the globe, while Dangote Sugar Refinery, a Nigerian private company, imports raw sugar from Brazil for processing in Nigeria for domestic and industrial consumption.

The emergence of indigenous African firms that are beginning to expand their operations beyond national borders suggests that, with continuing improvements in the business environment and removal of obstacles that impede regional trade and integration, regional value chains will develop to expand agro-industrial products trade.

Opportunities in traditional export markets

Earlier discussion illustrates how global agro-industrial exports have diversified significantly towards processed and high-value horticultural products over the last two decades. This shift was driven by changing consumer tastes, trade liberalization and advances in production, processing, transport and logistics. These dynamic segments of the global agro-industrial commodity market grew faster than total agro-industrial exports so that by 2008, processed commodities and horticulture accounted for nearly 47 per cent of global agro-industrial exports. If semi-processed commodities are added, the share increases to about three-quarters of total agro-industrial exports.

Opportunities also exist to enter into high-value markets for traditional export commodities. The markets for premium quality coffee, cocoa, organics and Fair

Trade products have grown considerably over the last decade starting from a low base. Many countries, including the United Republic of Tanzania with its Kilimanjaro specialty coffee, KILLICAFE, are targeting these markets to expand exports and diversify export outlets (World Bank 2007a).

Opportunities in emerging export markets

The emergence of the 'Southern drivers' of the global economy—China, India, Brazil, Indonesia and South Africa—and their growing trade and investment links with Africa represent another opportunity for expansion and diversification of agro-industrial trade in the context of South-South trade and cooperation. Table 5.8 and Table 5.9 demonstrate the growing importance of China and India as key trading partners for Africa in agro-industrial products.

During the period 1990-2008, China's agro-industrial imports from Africa increased tenfold from \$188 million to \$2 billion—an average annual growth

Table 5.8: China: Agro-industrial imports from Africa by commodity category, 1990-2008

Year	Total agro-industrial imports (\$ million)	Share of Total Imports (%)				
		Processed commodities for final use	Semi-processed commodities for processing	Unprocessed commodities for processing	Unprocessed commodities for final use	Horticulture
1990	187.98	0.00	3.75	94.84	0.13	1.27
1991	175.60	0.00	1.41	97.48	0.17	0.94
1992	164.24	0.04	0.40	97.10	1.20	1.26
1993	86.14	1.26	3.49	88.87	3.77	2.60
1994	190.11	0.32	4.95	91.96	1.64	1.14
1995	271.63	0.32	2.35	96.37	0.75	0.21
1996	366.52	0.09	6.18	92.65	0.58	0.49
1997	583.07	0.05	2.19	96.84	0.43	0.49
1998	290.23	0.37	1.53	96.46	1.32	0.31
1999	414.97	0.43	1.72	90.29	7.45	0.11
2000	607.62	0.86	4.98	86.28	7.69	0.19
2001	603.52	0.79	8.45	86.02	4.48	0.26
2002	739.63	0.90	7.81	87.14	3.75	0.40
2003	1,078.78	0.74	7.68	87.98	3.05	0.55
2004	1,441.59	0.55	6.70	89.54	2.55	0.66
2005	1,661.44	0.67	7.01	89.44	1.94	0.94
2006	1,991.84	0.62	6.82	90.78	1.38	0.40
2007	1,938.82	0.85	8.57	88.61	1.49	0.48
2008	2,025.26	1.20	11.39	85.52	1.28	0.61

Source: UNCTAD (2010a)

rate of 14.1 per cent. Over the same period, India's agro-industrial imports from Africa expanded at an even faster rate, increasing sixteenfold from \$82.4 million to almost \$1.4 billion—an average annual growth rate of 16.8 per cent. In this context Africa could intensify cooperation with China with a view to increasing exports of processed commodities, *inter alia* through leveraging FDI inflows into Africa's natural resources (chapter 7).

However, unprocessed commodities destined for processing and horticulture (which is largely composed of unprocessed commodities exported for final use) constitute the vast bulk of China's and India's agro-industrial imports from Africa. In 1990, the share of unprocessed commodities in China's agro-industrial imports from Africa was almost 95 per cent, declining somewhat to 86 per cent in 2008, reflecting an increase in the share of semi-processed commodities from 4 per cent in 1990 to 11 per cent in 2008.

In India's case, horticulture accounted for 81 per cent of agro-industrial

Year	Total agro-industrial imports (\$ million)	Share of Total Imports (%)				
		Processed commodities for final use	Semi-processed commodities for processing	Unprocessed commodities for processing	Unprocessed commodities for final use	Horticulture
1990	82.37	0.00	2.32	16.79	0.00	80.89
1991	91.37	0.57	2.60	16.96	0.00	79.87
1992	105.16	0.18	1.23	16.75	0.00	81.84
1993	142.32	0.26	2.92	18.33	0.25	78.23
1994	258.04	1.63	2.06	52.64	0.14	43.53
1995	332.05	0.03	1.14	36.83	0.08	61.92
1996	252.54	0.13	1.12	36.08	0.32	62.34
1997	306.51	0.25	1.78	41.75	0.08	56.15
1998	366.41	0.33	2.03	36.22	0.32	61.09
1999	486.66	0.07	0.48	46.03	0.02	53.40
2000	577.71	0.58	3.31	53.33	0.03	42.75
2001	442.49	0.40	5.65	64.39	0.75	28.81
2002	513.99	0.36	6.38	47.16	0.78	45.33
2003	614.31	0.54	4.99	46.28	0.72	47.47
2004	733.02	0.60	8.33	38.82	0.98	51.25
2005	837.90	0.69	8.61	35.67	0.89	54.14
2006	764.14	1.35	6.75	36.47	0.79	54.63
2007	920.67	1.19	5.97	44.17	0.72	47.95
2008	1,351.04	0.83	4.62	42.46	0.71	51.37

Source: UNCTAD (2010a)

Table 5.10: MFN applied tariff rates and distribution of tariff lines and import shares by duty classes in China										
Agricultural products										
	Simple Average	Duty-free	0<=5	5<=10	10<=15	15<=25	25<=50	50<=100	>100	NAV (%)
		Tariff lines and import value shares (%)								
MFN Applied, 2008	15.6	5.9	8.5	26.3	24.5	24.9	7.4	2.6	0.0	0.3
Share of imports		0.8	41.5	31.4	4.7	4.9	15.9	0.7	0.0	2.5
Notes: Number of MFN applied tariff lines (HS) is 2,797; NAV – Non-ad valorem duty										
Non-agricultural products										
	Simple Average	Duty-free	0<=5	5<=10	10<=15	15<=25	25<=50	50<=100	>100	NAV (%)
		Tariff lines and import value shares (%)								
MFN Applied, 2008	8.7	7.6	19.9	46.6	14.3	10.6	1.1	0.0	0.0	0.5
Share of imports		51.6	19.2	24.0	2.7	2.0	0.4	0.0	0.0	0.4

Source: WTO *et al.* (2009) Note: Number of MFN applied tariff lines Harmonized System (HS) is 7,716

imports from Africa in 1990 but this share fell steeply to 51 per cent by 2008. Over the same period, the share of unprocessed commodities destined for processing increased from 17 to 42.5 per cent of total agro-industrial imports from Africa. Table 5.10 and Table 5.11 indicate that both China and India apply tariffs to agricultural imports that are higher than what Africa currently faces in its major traditional markets in the EU and US. However, according to a recent WTO news item, India has started to offer duty-free and quota free treatment of exports from Least Developed Countries (LDCs) covering products such as cotton, cocoa, cane sugar and ready-made garments (WTO 2010). The challenges that will need to be addressed in Africa's future trade with China and India are discussed below.

Niche and specialty export market opportunities in developed and emerging markets

A range of niche and specialty export markets represent additional opportunities for Africa to expand agro-food exports to developed and other emerging market economies (UNIDO *et al.* 2008):

Table 5.11: MFN applied tariff rates and distribution of tariff lines and import shares by duty classes in India										
Agricultural products										
	Simple Average	Duty-free	0<=5	5<=10	10<=15	15<=25	25<=50	50<=100	>100	NAV (%)
		Tariff lines and import value shares (%)								
MFN Applied, 2008	32.2	5.4	3.9	3.6	5.9	4.6	66.9	7.5	2.3	0.3
Share of imports		6.8	4.0	2.4	3.1	1.0	56.6	25.3	0.7	2.8
Notes: Number of MFN applied tariff lines (HS) is 2,797; NAV – Non-ad valorem duty										
Non-agricultural products										
	Simple Average	Duty-free	0<=5	5<=10	10<=15	15<=25	25<=50	50<=100	>100	NAV (%)
		Tariff lines and import value shares (%)								
MFN Applied, 2008	10.1	3.4	14.4	74.0	0.5	1.7	5.0	0.8	0.1	5.8
Share of imports		9.0	43.4	8.3	38.9	0.2	0.1	0.1	0.0	0.2

Source: WTO *et al.* (2009) Note: Number of MFN applied tariff lines Harmonized System (HS) is 7,716

- a) **Organic food and beverages**, with a world market estimated at \$24 billion in 2005, mainly in the EU and the US. While the sector has witnessed a slowdown since the 1990s, the current growth rate is estimated at 8-12 per cent annually in Europe and 14-20 per cent in the US (Wilkinson & Rocha 2009).
- b) **Fair trade** evolved from the coffee sector and now comprises other products such as tea, cocoa, honey, juices, wine, grapes, fruit and vegetables, nuts and spices, as well as non-food items such as flowers, plants and seed cotton. The world market was estimated at \$1.6 billion in 2006 (Wilkinson & Rocha 2009).
- c) **'Origin-based' products** reflect quality with social and cultural values in collective local development. This comprises indigenous products, non-food products such as ethnic-based products (textiles) and products associated with sustainability.
- d) **'Functional' or nutritionally-enhanced food products**, responding to increased consumer concerns for health and food safety, have spurred much innovation for modified products in the food processing industry. This market segment represents a major long-term market opportunity.

These niche and speciality markets could provide important export opportunities for African agribusinesses.

Challenges in exploiting market opportunities

Generic challenges

In spite of many opportunities for African agribusiness exports, the continent also faces growing challenges in domestic markets. Market opportunities do not necessarily translate into domestic agro-industry activity. Due to globalization and multi-lateral trade liberalization, domestic agro-industries are being confronted with increasing competition in domestic markets from large MNCs benefiting from scale economies, established brand names and efficient distribution systems and value chains. Such competition is likely to increase as developed country and emerging economy exporters seek new market opportunities in developing countries. This underlines the imperative for domestic agro-industries to enhance capabilities and improve productivity in order to successfully compete in their own domestic markets.

Most of the products traded in the new dynamic market sectors are perishable. Quality and safety standards are more stringent. These markets also demand timely delivery and economies of scale, which create special challenges for smallholder producers and small-scale processing firms that are not equipped to meet the requirements and new competition from supermarkets operating domestically. Similarly, the ability of prospective exporters to comply with mandatory health and safety standards, as well as market-driven voluntary standards in overseas markets, is a major challenge. The poor provision of transport, trade logistics and infrastructure is a major obstacle to maintaining quality, reducing spoilage and ensuring just-in-time delivery to retailers.

Higher quality and differentiated products often face higher information barriers in accessing foreign markets (Brenton *et al.* 2008). Determining market trends and requirements accurately and in a cost-effective manner depends either on the capability of trade promotion agencies or access to efficient private sector service providers. Where public providers are weak, as in Africa, public-private partnership and aid for trade could help fill the gap.

Challenges due to ineffective regional integration

Despite the existence of various regional integration initiatives aimed at promoting trade among African countries, the low level of intra-African trade in agro-industrial products demonstrates the lack of effectiveness of current integration efforts. Regional integration has not led to improvements in regional infrastructure and services that support trade. Similarly, institutional weaknesses in customs administration and transit facilitation, as well as payment and insurance schemes, hinder intra-regional trade. According to the DTISs, regional trade in Africa continues to be hampered by weak coordination and harmonization of documentation, regulations and product standards. The non-convertibility at the regional level of African currencies, along with conflicting monetary and financial regulations at the national level, constitutes a further serious problem.

Trade with emerging markets

Two issues loom large in future agro-industrial trade relations with China, India

and other emerging economies: the first concerns the low share of processed and semi-processed products in Africa's exports to these countries, while the second relates to the relatively high MFN tariffs currently imposed on agricultural imports from Africa.

5.5. Strategies to improve trade and competitiveness

To exploit trade expansion opportunities on offer, African countries must develop a multi-prong strategy. Based on a review of recent studies (Newfarmer *et al.* 2009; World Bank & FAO 2009; Hanouz & Lawrence 2009) and lessons from the experience of emerging economy countries, the elements of a basic strategy to promote trade and competitiveness in agro-industrial products are described below.

Incentive structure and policy coherence

In order to ensure that physical, human and financial resources are channelled into sectors in which a country has a long-term capacity to compete, a careful analysis of the policy mix and incentive structure is needed. This requires a clear understanding of how trade, macroeconomic and sectoral policies interact to influence investment, output and trade decisions. Policy coherence is essential to ensure that measures influencing agricultural production, trade and competitiveness are coordinated in an integrated manner.

Reducing trade costs

Measures to lower trade costs must be part of any comprehensive strategy to improve the competitiveness of African firms. Reforms to improve access of agribusinesses to efficiently-produced inputs and supporting services are critically important. Enterprises that have to pay more than their competitors for electricity, water, telecommunications, transport and logistics, finance and custom services will find it hard to compete in any market. Allowing for competition in the provision of these services, while maintaining regulatory oversight, is the policy challenge that governments will have to address.

Proactive policies and institutions to support trade

In addressing market and government failures that hinder competitiveness, specific interventions and institutions will be needed. These will include business advisory services, export and investment promotion agencies, standards bureaus and agencies to support training and skills development, as well as innovation, clustering and networks. These agencies already exist in many countries, but because they often operate in isolation, they tend to be ineffective. In establishing and managing these agencies, the challenge lies in ensuring that they function within a coherent, integrated framework, rather than as a series of ad hoc interventions. An empowered and dedicated trade and competitiveness policy unit within government should be established and tasked with overseeing the activities of these agencies to ensure that they operate in a collaborative and complementary manner. But the primary purpose for setting up such a unit will be to address government failures and weak capacity for policy formulation, implementation and coherence.

Stronger regional integration within Africa

Regional integration should be incorporated as part of a broad strategy to address the many competitiveness challenges that plague Africa as a result of underdeveloped infrastructure, ineffective customs administration and lack of harmonization of policies and regulations. Regional integration can be an important mechanism for realizing full economies of scale in the provision of key infrastructure services. By ensuring better coordination between the institutions of different countries, regional integration can facilitate harmonization of financial services, product standards and the establishment of simplified customs procedures and documentation.

Strengthening South-South cooperation

The experience of South-South trade and regional trade agreements (RTAs) in Asia demonstrates that the growing interdependence of developing Asia is not solely a consequence of regional integration through RTAs. Integration was predominantly the result of intensification of intra-industry linkages and cooperation (UNIDO 2006a; UNCTAD 2008a). This makes establishment and facilitation of regional trade networks and innovative regional value chains an important aspect of the revised agenda for regional integration initiatives in Africa.

Aid for trade

Development assistance in the form of aid for trade is required to help African countries seize emerging opportunities in regional and international markets. But planning to make effective use of aid for trade should be part of a broad strategy to address the main impediments to trade and competitiveness. Given the multitude of challenges to be addressed and limited resources available, aid for trade should be directed towards measures with high multiplier effects in promoting trade. Increased investment in regional infrastructure and support to strengthen trade-related institutions such as standards, customs and trade promotion agencies within a regional framework are likely to yield greater benefits. In this regard, UNIDO's strategic framework for implementation of aid for trade (UNIDO 2009c) appears relevant and in line with the points raised here, as it rests on three pillars: a) developing competitive productive supply capacities; b) strengthening internationally-recognized conformity infrastructure and services; and c) ensuring efficient connectivity to markets.

Interregional free trade agreements (FTAs)

Another strand of the strategy will consider how the burgeoning trade between Africa and the emerging economies can be effectively managed to the benefit African agribusiness and exporters. Much of the trade is currently conducted in a haphazard, opportunistic manner. Formalizing this trade through interregional FTAs could create an opportunity to reduce the high MFN tariffs currently imposed on African agro-industrial exports and induce investment in agro-processing in Africa, which will eventually contribute to export diversification and earnings growth for agribusinesses and exporters.

There are encouraging signs on tariff reduction as Brazil, in addition to the case of India mentioned above, is also finalizing plans to offer duty-free and quota-free access to LDCs. As these schemes evolve, two important considerations need to be borne in mind. First is the need to ensure that there are no exceptions that will exclude important African exports. Secondly, it would be useful to explore the possibility of converting the offers of duty-free and quota-free access from emerging economies to binding commitments under World Trade Organization (WTO) Agreements. At present, the relevant WTO Agreement states that 'developing countries in a position to do so' (i.e. capable of offering such preferences) should offer them. This leaves it to each emerging country to decide whether it would extend preferences without making binding commitments. But with the economic power of emerging economies, the emergence of a new middle class with strong purchasing power and their increasing trade with Africa, an important opportunity for expansion of Africa's agro-industrial exports will open up if emerging economy countries could be persuaded to make binding commitments on duty-free, quota-free access to African exporters.

Economic Partnership Agreements (EPAs)

As part of their strategy under the EPAs, African countries need to focus on trade creation. Simultaneously, they need to consider how to minimize trade diversion and achieve a pro-development EPA (Brenton *et al.* 2008). As many African countries enter the new phase of the EPA process following the initiation of the interim agreements, they have an opportunity to negotiate for EPAs that will help to raise the competitiveness of African economies through reductions of internal and external trade barriers and active policies to address supply-side constraints and trade-related adjustment costs.

In tying together the various strands of the strategy pertaining to external trade regimes, it is important to bear in mind that global trade liberalization, in principle, is superior and will yield greater benefits to African countries than regional or bilateral trade liberalization. But in an imperfect world, Africa needs to use the variety of existing trade arrangements, preferences and technical assistance programmes synergistically to achieve its goals.

5.6. Conclusions

The ability of African countries to meet the growth and poverty reduction targets under the Comprehensive African Agriculture Development Programme and the Millennium Development Goals will depend largely on exploiting the emerging opportunities in domestic, regional and international markets for processed and higher-value agro-industrial products. Diversification towards these market-dynamic products has proved difficult for Africa, but the challenges are not insurmountable. Better policies can help to eliminate or attenuate the challenges that have been identified.

At the national and continental levels, policies to reduce supply-side constraints and improve business environment and incentive structure for agribusiness must be at the centre of growth and trade promotion strategies. At the international level,

5. Exploiting local, regional and international demand

agricultural trade reforms that lead to the removal of the most distorting policies that hurt African agricultural trade will be beneficial and will help to expand export opportunities for African countries. Aid for trade to build trade capacity, infrastructure and institutions will continue to be needed in the short to medium term.

With better and effectively-coordinated policies and concerted action at all levels, African countries will be better equipped to diversify and participate in the expanding markets for processed, higher-value agro-industrial products.

6. Strengthening technological effort and innovation capabilities

Karl Wohlmuth

6.1. Introduction

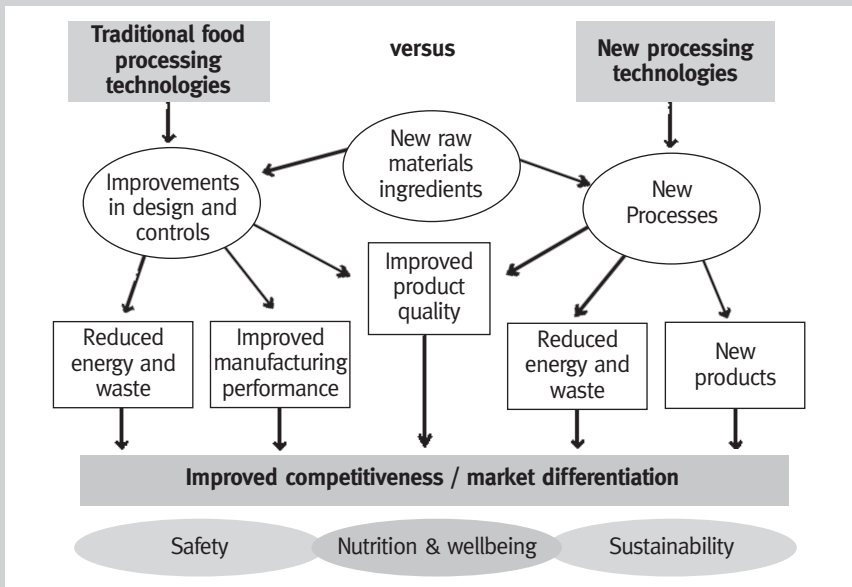
Following decades during which agriculture was neglected with scant attention paid to its role in the overall development process and inadequate donor assistance, especially to agro-industries and agricultural R&D, the mood has changed dramatically for the better. The launch by the New Partnership for African Development (NEPAD) in 2003 of a Comprehensive Africa Agricultural Development Programme (CAADP) set the tone. One of CAADP's four pillars explicitly targets agricultural research, technology dissemination and technology adoption. Although the envisaged volume of investment of \$5.5 billion out of \$251 billion over the 2002-2015 period is meagre (UN ECOSOC & ECA 2007), the initiative is an important step towards stimulating a 'green revolution' in Africa, similar to that enjoyed by Asia since the 1960s. Unfortunately, five years after its launch in 2003 many African countries had not begun to implement the agreed programmes or were well behind in implementation (Mkandawire 2008). As part of the implementation of CAADP, the Forum for Agricultural Research Africa (FARA) was set up as the technical arm of the African Union (AU) and NEPAD. Its task is to address perceived weaknesses in African science, technology and innovation (STI) systems that are impeding agricultural and agro-industrial development.

Unleashing the potential of traditional agriculture and of non-traditional agriculture requires the scaling up of science, technology and innovation inputs. This would need to be underpinned by new types of technological upgrading, to be used

Box 6.1: The impact on Africa of shifting agro-industrial technologies

Africa is affected by the global shift from traditional food processing technologies to newer processing technologies, involving increased safety, greater waste reduction, energy conservation, improved nutrition and well-being, and higher sustainability standards. There is more intensive use of new raw materials and ingredients. There is also a trend towards new processes; new products, market differentiation, and improved product quality (UNIDO *et al.* 2008; UNIDO 2005; UNIDO 2004) on technologies shaping the future of agro-industries). The figure below shows the complex bundle of changes in traditional and in new technologies for a dynamic agro-industrial development.

Technologies shaping the future of agro-industries



Source: Dennis *et al.* (2009)

within the context of the commercialization of both subsectors, thereby generating additional value added through enhanced technological, organizational, and marketing practices. To date, neither national STI policies in Africa nor donor assistance programmes to STI have provided the necessary support. In the past, donor support has been volatile, while government efforts were not strategically oriented towards promoting agribusiness activity, and this at a time when there is a major shift in the technologies used in agro-industries globally that will influence considerably production conditions in Africa (Box 6.1).

Sourcing of agricultural raw materials for agro-industry is another concern because agro-industry linkages depend on sourcing patterns. Recent shortages of cocoa beans, cotton, fish stock, and of timber in African countries illustrate inappropriate planting and conservation policies that have also exacerbated environmental problems. Many raw materials, such as cassava, have different end uses, and are used in industrial processing as well as for food. Shortages, as with cassava, can

occur in a particular use where incentives are inappropriate. Different forms of sourcing (private versus public sourcing firms, multinational versus local sourcing firms) have very different spillover effects on the economy, while innovation depends to a large extent on sourcing patterns and forms.

The chapter contributes to a better understanding of key policy requirements on how to use more effectively STI for agro-industrial development, by presenting five major dimensions for policy action, such as (a) the need for comprehensive STI indicator systems for Africa as a base for new agro-industrial development policies; (b) the potential of new STI policies for increasing the competitiveness of agro-industries in Africa, and how to convert comparative advantages into competitive advantages, through STI; (c) the role of strategies for technological learning and measures for increasing the innovation capacity, adapted to the needs of agro-industrial enterprises, value chains and clusters; (d) the importance of developing national innovation systems (NIS) in African countries as frameworks and tools for agro-industrial development; and of strengthening the links of the national innovation systems with sector-wide and subregional innovation systems, and (f) the feasible strategies and actions for developing STI infrastructure and building human capabilities for Africa's agro-industrial development are also captured. Although these five policy dimensions are relevant and applicable for all of Africa, irrespective of size and level of development, the modalities of implementation differ from country to country.

6.2. STI indicator systems for Africa

STI capacity can be measured in different ways—by single indicators and by comprehensive index scores. To improve the effectiveness of public interventions in STI and the overall policy framework, it is essential to know more about STI capacity in the agribusiness sector. In particular policymakers need to know more about R&D expenditure, technological levels and innovation trends in agribusiness. Unfortunately, information on African STI capacity is scanty. Some STI-related index calculations based on indicators, score values, and country rankings are available and a number of valuable composite indexes have been developed in recent years (Box 6.2). African countries with high rankings and high index values in such indices are relatively well-placed when it comes to the commercialization of agriculture, agro-industrial development, and the development of input and capital goods industries for agriculture.

Box 6.2: Innovation, human skills and technology capacity indices

A small group of countries is emerging as African leaders in technology and development, notably South Africa, Tunisia, Egypt, and Mauritius. These countries have a strong base in commercial agriculture and agro-industries, as well as in the supply of inputs and capital goods for modern agribusiness.

Methodologically, all the indices are different in data use (use of hard data versus data based on assessments of experts and on questions to specific core groups), in coverage of countries and of periods for comparisons. Although the use of such indices for policymakers is limited, the indicators presented and the values

aggregated to indexes and rankings are of some help to policymakers to compare the technological effort of their country with others. To obtain a more complete insight of STI trends, data on technology, knowledge and innovation systems at country level are needed most for policymakers.

The most important indicators are the following:

- UNIDO's Competitive Industrial Performance Index (CIPI)
- UNCTAD's Innovation Capability Index (UNICI)
- United Nations Development Programme's (UNDP) Technology Achievement Index (TAI)
- World Bank's Knowledge Economy Index (KEI)
- World Bank's Knowledge Index (KI)
- Warner's Economic Creativity Index (ECI)
- World Economic Forum's Global Competitiveness Index (GCI)
- UNIDO's Industrial-cum-Technological Advance Index (ITAI)

Country-level data on STI systems and the public expenditure on R&D are scarce especially for agribusiness, though this situation has begun to improve with the recent African Science Technology and Innovation Indicators Initiative (Nienke & Stads 2006), covering 19 African countries centered on the SANE countries (South Africa, Algeria, Nigeria, Egypt). The African Ministerial Council on Science & Technology initiative (AMCOST), designed to consolidate and harmonize national STI data, is contributing to this improvement.

South Africa with an R&D intensity (public R&D expenditure as a percentage of GDP) of 0.9 per cent leads the way in research spending but most SSA countries fare far worse with an average figure of less than 0.3 per cent (Mugabe 2009). However, such economy-wide aggregate data fall far short of what is needed for policy formulation in agribusiness. A major problem is the absence of data covering private sector R&D, though it is only in South Africa that the private sector spends more than government, accounting for 58 per cent of total R&D. The private sector's share of national gross expenditure on R&D in Africa is estimated to be at less than a quarter, and it is only South Africa and Kenya that have yet managed to attract R&D spending by foreign agricultural, pharmaceutical and biotechnology companies (ibid).

Data for the 19 country (SADC-plus)³¹ group show that tertiary-level enrolments in science and technology (engineering, agriculture and medicine) were very low at 28 per cent of all the students enrolled in 2005. There are only 48 full-time equivalent (FTE) researchers per 1 million inhabitants in SSA, though South Africa has a much higher ratio of 361 FTE to 1 million (ibid). Research productivity in terms of scientific publications is also weak, and only South Africa has a significant world share of 0.37 per cent of global science and engineering publications. The average age of laboratory equipment is very high (12 to 16 years in basic and engineering sciences), while access to library services, PC facilities and the Internet is limited (ibid). Furthermore, African countries score poorly in respect of university-

31. The 14 Southern African Development Community members (Angola, Botswana, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, U.R.Tanzania, Zambia and Zimbabwe) plus Ghana, Kenya, Rwanda, Seychelles and Uganda.

industry collaboration, though South Africa, the United Republic of Tanzania and Kenya are in the top 50 countries listed in the World Economic Forum's Global Competitiveness Report 2006-2007. Sub-Saharan Africa accounts for less than 1 per cent of world patents and South Africa—with 874 patents filed and 354 granted between 2000 and 2004—is the region's only significant participant (ibid).

A number of steps have been taken to try to remedy Africa's STI deficit. The International Food Policy Research Institute (IFPRI) provides some comparative data on African agriculture, as also does the ASTI (Agricultural Science and Technology Indicators) project of IFPRI. Drawing on data for 27 sub-Saharan countries, the *Background Report on Agricultural R&D in sub-Saharan Africa* (Nienke & Stads 2006) provides data on the structure of public agricultural R&D expenditures and identifies weaknesses in public agricultural R&D systems. This study calls for the doubling of Africa's agricultural research intensity—public agricultural research spending as a share of agricultural GDP—by 2015. In fact, this is an extremely modest target given that this percentage was only 0.7 in 2000, down from 0.84 per cent in 1981. Indeed, during the 1990s public agricultural R&D ratios declined in half of the 27 countries and if South Africa and Nigeria, with research intensities above two per cent, are excluded the continental average slips to only 0.53 per cent (Nienke & Stads 2006). Going forward the challenge is to restore and enlarge the funding base for agricultural R&D, partly by involving other actors, especially from the private sector, so that R&D investment becomes more diversified and demand-driven.

Other indicators—R&D expenditures *per capita* and the R&D expenditures per economically active population in agriculture—show similar declining trends. Agricultural research is highly concentrated in just five countries—Nigeria, South Africa, Kenya, Sudan, and Ethiopia—accounting for some 40 per cent of all research staff. The brain drain of the researchers, lack of research funds, declining support staff per researcher, and inadequate research infrastructure restrict the scope for effective agricultural R&D. The 32 per cent decline between 1971 and 2000 in spending per scientist illustrates the gravity of the situation, though in Ghana and Kenya resources per scientist increased between 1981 and 2000. In Mali, Mauritius, Nigeria and South Africa levels of spending per scientist also increased, although this was achieved in part by reducing the number of researchers (Nienke & Stads 2006).

Agricultural R&D depends heavily on donor funding, and this creates serious problems when programmes are discontinued. However, Benin and Cote d'Ivoire and to a lesser extent also Senegal and Niger have succeeded in financing R&D also from other sources, including research contracts, the commercialization of agricultural produce, and the profitable dissemination of research results. Normally such new funding modalities involve the use of production or export levies on export crops; so in East Africa levies on coffee, tea, cotton, tobacco, cashew, and sugar cane contribute substantially to R&D budgets (ibid).

All these problems (declining R&D shares, volatile funding, human resource scarcities, donor dependence, focus of research on export crops, and insufficient research on post-harvest agro-industrial activities) need to be tackled urgently and in an integrated way. At present, agricultural R&D spending is heavily concentrated

in government hands (77.4 per cent of researchers) and in higher education institutions (19.3 per cent). Only two per cent of all R&D expenditures in the 27 countries are private sector-based, and even this tiny proportion is focused largely on the provision of input technologies or on technological devices for agricultural production. A large share of private funds is contracted out to government agencies and to higher education institutions to perform research.

This highlights the need to build strong collaborative links between public research institutions and universities and the agribusiness private sector. At the same time the distribution of research effort needs to change with a greater focus on forestry, socio-economics, fisheries, and off-farm post-harvest activities that currently account for 5 to 6 per cent each compared with 46 per cent for crop research, 20 per cent for research on livestock resources, and 9 per cent on research for natural resources (ibid). The share of off-farm post-harvest research is far too low, given the importance of adding value to agricultural produce.

Country case studies show that even in countries committed to the reform agenda, such as the United Republic of Tanzania, change is slow, especially in reforming the public agricultural research and development (AR&D) sector. While reforms are underway in some countries, the impediments are great: fragmented STI capacity; poor technology and knowledge diffusion mechanisms; stagnant or volatile R&D investment; biased priorities because of high donor dependency; overstretched public budgets; low public capital investment for R&D; unbalanced financing mechanisms with insignificant private R&D funding; low salaries and insufficient support for researchers; weak organization and management, and a failure to develop a more demand-driven research agenda (ibid).

One cause for optimism however is the fact that R&D investments in African agriculture have similar returns to those in other regions. Poverty reduction per dollar of agricultural R&D investment is even greater in Africa (Masters 2008), meaning that poverty reduction would be accelerated by investing more in agricultural R&D. Indeed, the impact would be even greater were the post-harvest share of AR&D to be increased.

6.3. Converting comparative advantages into competitiveness

A growing number of African countries have integrated STI objectives into Poverty Reduction Strategy Papers (PRSPs) in order to attract donor funding (UNCTAD 2007a). It is not clear, however, just how strong the commitment to STI really is, not least because of the difficulties of coordinating STI programmes across a number of different government ministries. Although some countries, such as Kenya in its Vision 2030, did explicitly integrate STI into its economic plans (Mugabe 2009), implementation has been hindered by inadequate finance and the adoption of a top down' management approach, meaning that there is no involvement of local and provincial producers and users of knowledge in the process of decision-making and prioritization. Mozambique's Ten Year Strategy for science, technology and innovation outlines a comprehensive STI programme, while South Africa has prepared a series of STI plans, such as South Africa's National Research and Development Strategy (2002), and The Ten-Year Innovation Plan (2008).

In many other countries however, no organized priority is accorded to R&D. Not only is it unclear how R&D priorities are set and how funding, allocation and disbursement decisions are made, but there is little analysis of how linkages could, and should, be developed between the R&D system and the productive sectors. Some of the 19 SADC-plus countries have common long-term research priorities in crop breeding with emphasis on cereals, livestock diseases, and the conservation and use of marine resources, while an increasing number of these countries are emphasizing biotechnology. In their R&D priorities, Mauritius and Zimbabwe have identified specific products, such as sugarcane, tobacco, and cereals, but neither the extent of R&D collaboration nor the level of allocation and spending for these research areas can be quantified. Institutional arrangements differ between the countries as do the quality of institutions and the suitability of the R&D infrastructure.

All the 19 SADC-plus countries have agricultural plans with explicit R&D policies, although neither implementation nor funding details are made clear. Kenya and the United Republic of Tanzania have legislation designed to improve coordination between STI institutions. Many other countries rely only on implicit policies in the form of tax regulations, customs and excise duties, immigration laws, fiscal policies, industrial policy, health and safety regulations, and environmental impact measures. Such implicit policies may facilitate technology imports, the protection of equipment producers, the recruitment of foreign skilled manpower, the increase of R&D expenditures by tax allowances, and the dissemination of modern technology by specific health, sanitary and environmental standards and safety regulations.

STI links from scientific knowledge to technology development and to innovation and imitation at enterprise level are not adequately covered by policymakers in most of Africa. Only South Africa has an explicit national innovation policy regime with national innovation plans and an elaborate national innovation system (NIS). South Africa's Ten-Year Innovation Plan prioritizes the skills base, the country's share of global patents and global publications, the energy infrastructure, and the commercialization of research results by using new funding instruments (Mugabe 2009). South Africa—besides its strong emphasis on explicit STI policies—also makes use of various implicit policies like trade, finance, taxation and competition policies, though there is a risk that these may conflict with the explicit ones. Two main risks are prominent:

- The support of large industries—which undertake considerably more private R&D—at the expense of support for SMEs, which need much greater access to industrial research and technology development centres.
- The preference for specific and specialized training programmes over broad-based skills development programmes—a tendency leading ultimately to even more severe human resource shortages.

In contrast to the explicit route, Mauritius and Ghana have adopted an indirect approach by integrating STI policies into the trade, investment and industry policy frameworks. This approach facilitates the technological learning in enterprises through the import of specific technologies and skilled manpower and the support of exports to demanding overseas markets.

Many African LDCs still rely on traditional—protectionist, ‘picking the winners’ and regulatory—forms of industrial policies rather than embracing the recent focus on intensified public-private sector collaboration as the pathway to accelerated industrial and agribusiness development. The choice between implicitly and explicitly formulated objectives and instruments and traditional and contemporary industrial policies will have far-reaching ramifications for future STI decision-making (UNCTAD 2007a).

Chile and Malaysia have used new industrial policies—based on intensified public-private sector collaboration and associated with proactive STI policies—successfully to achieve agro-industrial development, and African policymakers have much to learn from the evolution of the fruit, wine and fish (especially salmon) industry in Chile (Iizuka 2009; UNIDO *et al.* 2009; Kjällerström 2007; Kjällerström & Dallto 2007) and the palm oil industry in Malaysia (Kjällerström & Dallto 2007; Kjällerström 2007), where the sequencing of public and private actions is of particular interest (Box 6.3). These are sector and product examples of how integrated STI policies and the application of new industrial policies create an environment for agro-industrial expansion and the development of private agribusiness. These examples show that comparative advantages are converted into competitiveness (in terms of productivity, networking and quality).

Box 6.3: Translating comparative advantages in agro-industry into competitiveness by STI policies and inputs

Chile built competitive advantages in new market niches by upgrading processes and products—fresh grapes, fresh or chilled fish fillets, avocados, berries, and wine. Fruit and fish exports of this kind employ advanced technologies and services at different production stages—computerized irrigation for fruit, modern selection and packaging systems, controlled atmosphere storage, and air-conditioned transport. Early public investment in knowledge and infrastructure were key factors of success while targeted credit and technical assistance programmes for small farmers also contributed as did sanitary and phytosanitary programmes. Over time, the scale of public assistance and subsidies increased with the development of comprehensive programmes for the fruit sector (Plan Fruticola), and a close cooperation with domestic and foreign universities and public agricultural research institutions became part of the success story. National research institutes benefited as well from the demand for their services, so that qualified researchers could be recruited and trained, and research & development became demand-driven.

In this process human capital, foreign technology and infrastructure were optimized. Private sector investment responded as investment risks were reduced, and in the 1970s large companies entered the sector with the result that research became even more demand-driven by performing tasks for these companies. PROCHILE, as a government agency, became responsible for exports, giving credit to medium to large-scale producers. The agricultural research institution INIA targeted groups of producers for extension and technology transfer programmes, resulting in the setting up of private producer organizations. Partnerships have been established between small companies and larger companies to ensure that they benefit from the process.

In *Malaysia* landless Malays were resettled in an organized smallholder palm oil scheme programme that was coordinated by the FELDA (Federal Land Development Authority). Public policy played a key role in R&D, market development, and in establishing a regulatory framework to guarantee quality standards. Another public organization, the MPOPC (Malaysian Palm Oil Promotion Council), promoted the sale of palm oil overseas, providing technical support and market information. The production of palm oil is being oriented towards biofuels through a National Biofuel Policy (NBP). The NBP has a four-pronged strategy: demand creation by producing a bio-diesel blend; awareness creation among consumers; establishing an industry standard for bio-diesel quality; and promoting the establishment of bio-diesel plants. Many bio-diesel manufacturing licenses have been granted and other uses of palm oil, notably cosmetics, are supported also by R&D inputs.

Sources: Kjällerström & Dallto (2007); Kjällerström (2007); UNIDO *et al.* (2009)

In its approach to STI policy South Africa is certainly unique in Africa with its adoption of more explicit STI policies and new industrial policies (OECD 2008). The appropriate combination of explicit and implicit policies is however important for a successful shift from traditional industrial policies based on protection, subsidies, regulations, top-down government decision-making, and various prohibitions, to a new collaborative and innovation-based industrial policy approach. This new approach in South Africa focuses on entrepreneurship development, science-based structural change and technological development, the promotion of innovation and imitation at enterprise level, the strengthening of national innovation systems, and greater university-business collaboration and public-private partnerships (Republic of South Africa 2008). Although South Africa is advanced in this regard, other African countries can learn from the experiences gained in this country, and some already do, especially in the SADC area. Business interactions with South Africa also do favour this trend.

South Africa is closer to meeting the six critical elements for success (Box 6.4) than any other African country thanks to the considerable STI inputs to its agro-industry products and inputs, the long-term approach in policymaking, the existence of producer forums and alliances, local branding and product differentiation activities, and policies to align the NIS and the agricultural innovation system (AIS) with the changing demands of agribusiness. However, there are weaknesses in South Africa that need to be addressed, such as the decline of agricultural R&D since the 1990s and a lack of synchronization between STI policies and other policy areas in trade, taxation, education, small industry promotion, and competition. The country is also rapidly becoming part of global enterprise alliances in agribusiness, joint ventures and networks, which provide an opportunity to innovate by upgrading global value chains. However, South African companies are also increasingly networking with other African countries so that they benefit from the global alliances.

One established South African company—Outspan International—is an example of the successful marketing of fresh fruits, especially citrus, to the world market. Fresh food processing is an advanced and highly complex processing activity (UNIDO 2006a), as interaction of technologies and logistics inputs is of key

importance. An increasing number of South African agribusiness companies, such as Illovo Sugar, are now active in African and global markets, and have the potential to become lead companies in agro-industrial value chains (OECD 2008).

Box 6.4: The six critical factors for converting comparative advantage into competitiveness by incorporating STI inputs and STI policies

Lessons from Asian and Latin American experience (Box 6.3) suggest that success is dependent upon the mutual, systemic and long-term interaction of six factors:

- 1) *Creating the infrastructural and legal preconditions for sustainable export success.* Agribusiness must be provided with infrastructure, including STI infrastructure, and with institutions for enhancing export activity to reduce investment risks.
- 2) *Designing and implementing comprehensive long-term strategies.* Such strategies for the agribusiness sector, including STI strategies, have to be developed by government and by the private business organizations in partnership with actors along the whole value chain.
- 3) *Organizing targeted public transfers to specific groups of private sector producers.* Groups of large and medium-sized producers and associations and cooperatives of small producers will need to be targeted with specific support programmes and provided with assistance in the fields of credit, information, marketing, research, and institutional capacity building.
- 4) *Coordinating and upgrading global market activity by coherent public and private action.* New export markets for improved traditional or for new export products have to be identified. This requires that overseas and regional markets are continuously researched by export marketing councils, which are established by government and private sector offices. Support from applied R&D institutions is needed.
- 5) *Providing for sustained large-scale action over a long time horizon and ensuring the concentration of effort.* Success depends on the scale of monetary, logistical, STI and institutional support and on the concentration of effort, so that the critical minimum of funding new products and new technologies can be reached; supporting groups of large, medium and small-scale producers over the long run is needed to guarantee sustainable success.
- 6) *Creating appropriate innovation platforms linking producers and public research institutions.* Adapting health and environmental standards and safety and intellectual property regulations to world class level is needed so that producers are being forced to adapt to these by competitive pressure; creating own regional standards may be a desirable strategy.

Case studies of other African countries show that many or most of the six criteria have not been met and progress towards meeting them is slow. Case studies of a group of nine countries with a proven willingness to implement reform programmes, by the OECD & DC (2008); FAO (2008); Larsen *et al.* (2009), show that the six criteria have not been fully met. Cooperation of government with the private sector and the NGOs, and a close collaboration across government ministries, is a prerequisite for the successful design and implementation of a long-term strategy. Often implementation is derailed because donor-driven projects and resources are volatile and shifting public priorities lead to rapid policy changes.

While some countries invested in infrastructure as a means of boosting exports this did not always satisfy regional and global requirements. Market liberalization and privatization policies may have led to increased competition in some African countries, but they may have undermined public marketing institutions in their R&D, training and extension functions.

In some countries small-scale producers were organized in producer associations and there were attempts of integrating these into value chains and clusters. However, neither small-scale producers nor medium to large-scale farmers and businesses were fully involved in a public-private sector dialogue on priorities and instruments to support agro-industries and on public resource allocation decisions. In some countries—notably the United Republic of Tanzania and Kenya—agribusiness firms were even forced to adopt ‘do it alone strategies’ to counteract corruption and bureaucratic delays (Box 6.5 and Box 6.6). The case studies demonstrate that STI policies are not focused enough and not integrated with other policies, nor are they complemented by education, skills development and training reforms. Consequently the establishment and upgrading of technology development institutions falls well short of what is required. Furthermore, more STI inputs are needed to help producers create innovation platforms for product and process upgrading by competing in the field of health, sanitary and environmental standards and regulations.

The African fish export industry is often cited as a success story, but exports are volatile with only a handful of countries—Eritrea, Guinea, Mozambique, the United Republic of Tanzania and Uganda—managing to stabilize supply and achieve steady export growth (UNCTAD 2006). External factors—market access, changing demand patterns, and the over-exploitation of fish stocks—have contributed to the sector's instability. While the United Republic of Tanzania is often portrayed as a country that has managed to diversify its export portfolio by developing non-traditional exports (gold, fish, and cut flowers), close analysis of the fish export industry identified a range of serious problems (Box 6.5). Environmental factors also may increasingly affect the supply of raw fish, so that new policies and new technologies are needed to secure long-term supplies. In this regard, modern fish export firms must be technology-intensive and science-based to manage cold chain processing and to meet exacting health, sanitary and environmental protection standards, and the experience in the United Republic of Tanzania illustrates the industry's shortcomings, underlining the degree to which the six critical factors (Box 6.5) have not been met.

Experience in horticulture has been similar in this respect (Box 6.6). Private horticulture firms in the United Republic of Tanzania and Kenya share some common characteristics, largely because of their ability to work and organize themselves independently of unfavourable bureaucratic government interventions and despite the serious lack of support in services and proactive sector policies (Utz 2006; Steglich *et al.* 2009). But the long-term feasibility of such ‘do-it-alone strategies’ has to be questioned, as the public goods that are critical to such a sophisticated production, such as research and development, training and extension services, are seriously undersupplied.

Box 6.5: STI as a constraint to Tanzania’s export diversification into agro-industries

Although the United Republic of Tanzania has made progress in export diversification the research and development system is still weak and insufficiently integrated with agriculture and industry. The human capabilities that are needed for the acceleration of agriculture and agro-industry are inadequate, as a result of which further progress in export diversification may not be sustainable. The fish industry illustrates the problem.

There are two parallel fish supply chains competing for the raw fish—a domestic value chain and an export-oriented value chain. The fish market is clearly segmented with the same raw product moving through two channels with very different technological and logistical standards. There is no shared use of service industries, processing units, and of the other assets, which are required by the two systems, and so scale economies are not being exploited. Consequently, fish processing is constrained because resources and assets are not used efficiently once the raw product is landed. An upgrading of both value chains underpinned by the integrated use of the infrastructure by both chains, and a better linking of domestic STI capabilities with the sector would be advantageous for both sets of producers and would generate wide spillover effects.

Several of the six prerequisites necessary for a successful agro-industrial expansion (Box 6.5) have not been satisfied in the United Republic of Tanzania. There is no strategic orientation on the part of public actors, no use of the export value chain innovation platform for the domestic value chain, no targeting of public support to producers in the domestic segment, and no scaling up of the fish sector by integrating the two chains. There has been no concerted attempt to build sector-wide associations and organizations of producers and service providers for the two segments, and there is little dialogue between public and private actors. Instead private producers had adopted a ‘go it alone approach’ which is unlikely to succeed for the long run in the absence of appropriate public action and support. Source: Wangwe *et al.* (2009); Utz (2006)

Box 6.6: Homegrown Ltd.: A Kenyan market champion in the horticulture sector

Some companies in African agro-industry grow successfully despite unfavourable policy and infrastructure environments. Homegrown Ltd, being part of Flamingo Holdings, which was taken over by rival James Finlay’s Limited, established in 1986, has invested over \$100 million in Kenya and employs over 8,000 people; it has become a multinational enterprise with its own in-house farmer training and extension services.

Homegrown is a vertically-integrated business connected to the final markets in Europe, mainly the UK, and is operating an explicit value addition strategy in Kenya. Homegrown’s practiced internalization (‘do it yourself’) strategy was adopted because of dissatisfaction with public authorities and public research institutions. It has a training and technology sister company, Dudutech, which supplies its research and technology requirements while also exporting services to South Africa. The company is also strong in environmental protection services, and is sharing increasingly a ‘sustainable development’ philosophy in their production, transport and marketing activities.

These do-it-yourself strategies, however, have limits in terms of scale, domestic linkages, and long-term sustainability. Both, short-term public action (tax incentives

to support out-grower contracts for smallholders) and long-term public action (to develop agro-industry on a broader scale) may be needed to facilitate broad-based private sector development. A greater role of the government, especially through supplying public goods like research and extension services and learning how to deal with the private sector in a collaborative way, is therefore recommended.

Sources: Steglich *et al.* (2009); Nyikuli (2008)

Ghana's partial success in the pineapple industry is illustrated by its ability to meet some of the six critical factors for sustainable export success. In response to increased competition from Costa Rica, Ghanaian producers switched to higher-yield cultivars, a strategy that was supported by the Agricultural Services Support and Investment Programme (ASSIP). Competitiveness has been constrained because some other elements of the six critical factors were not met, such as the scale of operations, coherent public policies, and the organization of groups of producers. Most importantly, collective capabilities have still to be developed among private producers, and as a result of local entrepreneurial weaknesses donors and government institutions have driven the reorientation process (Kjöllerström & Dallto 2007). Cote d'Ivoire had some success in upgrading production and marketing in its pineapple sector to meet changing world demand, but the political conflict in the country resulted in severe market share losses (*ibid.*). Both countries have not yet managed to integrate private producers into an innovation platform, especially by accepting and developing standards and regulations for the industry, thereby failing to create a technical learning process that is endogenous to the private sector.

There are many successful examples of creating 'distinctive values' for traditional agricultural products in Africa (Light Years IP 2008), with some countries using branding to manage intellectual property (IP). Instead of selling under brands of international companies, local brands are developed. Developing identifiable trademarks and brands for fine coffee products, like Ethiopian Harar, Sidamo, Yirgacheffe coffees, will increase the per unit retail price of coffee in high-income markets. This 'branding from below strategy' (UNIDO 2006b) is becoming popular in Africa, because it empowers local producers and cooperatives to reap the benefits of high-value trademarks and brands, though this too will yield results only if the six critical factors for export success are satisfied.

Recent estimates show that for 12 traditional agro-products export income can be increased by a factor of two to three times when IP strategies are used³² (Light Years IP 2008). It is estimated that such strategies could increase the value of exports of Ethiopian fine coffee from \$400 million to \$1.2 to \$1.6 billion while also generating positive spillover effects in the form of complementary investments in quality management, production improvements, and access to new markets. The Ethiopian Intellectual Property Office (EIPO) has joined forces with the Ethiopian Fine Coffee Stakeholder Committee, a union of coffee farmer cooperatives, private coffee exporters, and other stakeholders to promote coffee sector development. This partnership with distributors, roasters and retailers entails considerable learning

32. Examples include Kenyan tea, Sudanese cotton, Ethiopian fine coffee, Namibian marula oil, Togolese black soap, Senegalese tuna, Tanzanian blackwood, Mozambican cashews, Ugandan vanillas, Madagascar cocoa, Malian mud-cloth and Ethiopian leather.

effects and brings with it important feedback for the Ethiopian coffee producers, giving all the partners mutual advantages. However, the six critical factors for success have to be met and it is not evident that this stage has been reached yet.

The Ethiopian leather industry has enormous potential to exploit IP strategies for sophistication, and it is well-placed to capitalize on accumulated industrial experience, a great number of suppliers, a skilled workforce, and huge livestock herds (UNIDO *et al.* 2009). Divine Chocolate Ltd. in Ghana is another example of the use of IP strategies to increase value added, while broadening the participation of local coffee growers who own 45 per cent of the capital. Again however, many of the six criteria have not yet been met.

6.4. Technological learning and innovation capacity

Technological learning

African economies are dominated by small-scale actors (SMEs and informal enterprises) accounting for over 60 per cent of GDP and 70 per cent of total employment in low-income countries, and for about 70 per cent of the GDP and 95 per cent of employment in middle-income economies. A feature of African economies is the 'missing middle' - a small number of large firms operating alongside the large majority of small-scale players with very few firms in between these two extremes (OECD 2008). Of 49 international agro-food giants, 25 are active in Africa, and out of the 500 leading African firms by sales revenue, 111 are listed as active in the agro-food supply chain (*ibid*). Agro-industry enterprises by size range from foreign giants and large African companies to SMEs, microenterprises and informal firm units.

Technological learning in the firm is a complex process, dependent on a wide range of conditions within the firm, as well as on the business and policy environment within which the firm operates (UNIDO 2002; UNIDO 2005; Knell 2008; UNCTAD 2006; UNCTAD 2007a). Technological learning requires linkages among actors in business—customers, suppliers, service providers and consultancy firms—underpinned by support institutions of all types. UNIDO has described different technological learning trajectories, including a three-stage model for building capabilities within firms (UNIDO 2002) that emphasizes the various channels of technological learning. Starting small and increasing technological capability incrementally is a widely-used approach (Box 6.7).

Box 6.7: Technological learning and innovation in a Kenyan textile and garment producing firm

Bedi Investments Limited (BIL) in Nakuru, Kenya started garment production in 1976, becoming a backward-integrated manufacturer of fabrics and yarns. The company sees its competitive advantage in areas such as market access, short lead times, quality production, and constant innovation in design and development. It built its basic competencies by using international standards—ISO 9000 quality manufacturing standards—as a benchmark and employs a significant number of technical staff to develop substantial in-house R&D capacity. Exporting is also an important source of innovation as BIL has been forced to upgrade continuously to

meet international standards that necessitated modern equipment, close quality control, and training of skilled personnel (UNIDO 2002).

While productivity has advanced, maintaining competitiveness depends on stronger design capacities so that the business can move up market. This strategy is threatened by recent developments, notably Kenya's import and tax policies in respect of foreign and second hand imports known as "Mitumba", and as well severe cotton sourcing problems due to drought and domestic cotton sector policies. Cotton supply is erratic and prices have been volatile. There have been value chain problems too, especially with ginning firms. Close cooperation with the Kenya Agricultural Research Institute (KARI) is envisaged in the hope that this will improve cotton supplies. The most important strategies for value addition in a vertically integrated firm are improving in-house R&D capacity, quality management, market research, and design capabilities.

Sources: UNIDO (2002)

A different trajectory is evident in some South African firms that have been able to develop their own technology to the stage where they have become South-South technology exporters (Box 6.8). However, even less developed African countries can export knowledge to more developed countries as seen in the case of Sudan's grass roots innovations in agro-industrial equipment manufacturing, and the commercialization of pharmaceutical products based on rare plants (UNIDO 2006a).

Technological capability in a firm flows from the ability to acquire mature technologies, the ability to undertake incremental innovations, the ability to develop new markets, and the ability to develop linkages with other enterprises, thereby giving scope for learning from collaboration. R&D institutions and technological support organizations are essential too so that firms can more readily access knowledge. Firms build their knowledge base through education and training, by tapping into foreign technology transfers, and by exploiting the increasing mobility of experienced technical personnel (UNIDO 2002; UNCTAD 2006).

Box 6.8: South African services, technology and know-how exports to other African countries for agro-industry development

South Africa is increasingly becoming an exporter of technologies and technological services to other parts of Africa. Falcon Agriculture Equipment (Pty) Ltd is the largest agricultural machinery manufacturer of tractor mounted rotary cutters in Africa. Falcon Agricultural Machinery is a producer of models for general grass cutting, bush cutting and haymaking, and of a range of ground-care models. All the machinery that is produced is designed to be simple, safe, and serviceable. Maintenance costs are kept to a minimum by the small number of wearing parts, while innovation is geared towards technologies suitable for tough working conditions. The company is now active in nine South and East African countries.

Most of the large South African companies in agro-industries, in equipment production, and in input supplies are active in other African countries (OECD/DC 2008). SABMiller Breweries is establishing brewing and bottling facilities, and sales and marketing representations in other African countries, thereby exporting technologies. Illovo Sugar as the largest sugar producer in Africa operates in South Africa, East Africa, and West Africa. Illovo Sugar produces a wide range of items across the sugar value chain (sugar cultivation, sugar refining, and the production

of a variety of alcohols and other by-products). It has outgrower programmes in African countries to source sugar cane, and is innovative with its sugar fortification programme of adding vitamin A to cane yields.

South African companies also export technologies and know-how in distribution, by investing in new supermarkets or licensing their brand names (ShopRite, Massmart, Checkers and Woolworths) to franchising partners. Four fifths of African outward investment is undertaken by South African companies. South Africa may also become an important technology exporter in biotechnology. It has a growing number of small and medium-scale companies in which it develops mainly low-tech modern biotechnology.
Sources: OECD (2008); Republic of South Africa (2008)

Using the World Bank's Investment Climate Assessments (ICAs) the important channels for acquiring and improving technology in developing countries can be pinpointed. Firms can acquire knowledge via new machinery and equipment; key personnel; collaboration with customers; internal R&D; trade fairs; collaboration with suppliers; transfers from the parent company; hiring consultants; licensing from international sources; licensing from domestic sources; business or industry associations; universities, and public institutions (Knell 2008; UNCTAD 2006).

Modern capital equipment is—because of embodied technology—cited as the first important source of technological learning, but the data on imports of new equipment, especially for agro-industrial development, suggest that African countries have not been significant importers. Between 2000 and 2005 the share of agricultural machinery in total LDC capital goods imports was 1.5 per cent—less than half the level of the 1980s—and the decline was caused mainly by the downturn in African agro-industrial development and agribusiness (UNCTAD 2006). In recent years, imports of capital goods are the product of increased investment in natural resource extraction, notably oil, gas and minerals, and in low value-added manufacturing (*ibid*). To make the African green revolution a reality much higher levels of imports of agricultural equipment and machinery will be required to transfer technology, along with pursuing local initiatives to expand production of agriculture-related capital goods for acquiring local technological capabilities. There is some evidence of this trend in countries that have begun to reform their agribusiness sectors (UNECA & African Union 2009; OECD & DC 2008; Larsen *et al.* 2009; FAO 2007b).

The second important source of learning is either firm-based human capital in the case of African LDCs or internal R&D in middle-income countries (UNCTAD 2006; Knell 2008). However, R&D in international firms is mainly carried out at the headquarters, as it is the case with the 25 global agro-industrial companies with affiliates in Africa, or is concentrated in a handful of the African countries (South Africa, Nigeria, and Egypt) where the 111 large African agro-industrial firms are headquartered (OECD 2008).

Collaboration with customers can also be an important source of technology transfer, but an analysis of the impact of foreign customers on producers, when assessed by export activities at various processing stages, shows very limited technological learning from this source (UNCTAD 2006). UNCTAD's analysis of 24

value chains in which LDCs participate reveals that LDC firms have managed to upgrade higher stages of processing for export in only 7 out of the 24 value chains, whereas in 12 chains downgrading took place. In three value chains, the position was unchanged, while in the remaining two there was an 'apparent upgrading' in the form of reduced specialization in products at the lower processing stage. Exporters from African LDCs managed to upgrade only in cotton, aluminum, wheat and nickel, and the integration of firms into these value chains has achieved only very minor revealed learning effects.

Licenses and other forms of technology transfer from MNCs play a minor role in Africa, especially in agro-industry. Spending on imports of such types of 'disembodied technology' (which is not associated with purchases of capital equipment known as embodied technology) by LDCs is only \$0.07 per head against \$ 0.36 in other developing countries (*ibid*).

FDI as a source of technological learning has made a minimal contribution to technology transfer in Africa, partly because the usual pattern has been one of enclave-type development with few linkages to the rest of the economy. Direct investment in natural resource extraction, notably oil, gas and minerals, and in low value-added manufacturing is still of overwhelming importance. Affiliates of international enterprises in African LDCs, including agribusiness companies, receive little technical support from their headquarters, though South Africa and some other African middle-income economies may benefit more from this source of technology transfer (Goedhuys 2007; UNCTAD 2006; OECD 2008).

Generalizations can be misleading as there are significant differences between African countries in their technical learning patterns (Knell 2008). Thus, in Ethiopia and in Uganda technology embodied in machinery or equipment has made an important contribution. While thus imports of capital goods have been a major source of technology transfer also internal R&D plays a role. In the United Republic of Tanzania, machinery and equipment purchases, internal R&D, and the collaboration with other firms and customers are important for technical learning at enterprise level.

The evidence suggests that African enterprises are more likely to source technology indirectly than directly—more by purchases of machinery and equipment than by explicit technology transfer, investment for technology collaboration, or technology assistance contracts. Technological progress is achieved also in Africa—but to a lesser extent—through participation in trade fairs, research and development collaboration, hiring skilled personnel, and investing in skills development (*ibid*). However, there is a contrast to the way how Taiwan and South Korea have acquired their technological capabilities at firm level—the use of consultants was very important. In Africa, recruiting consultants in the production process at firm level is just gaining more importance, especially for the smaller companies.

Goedhuys (2007) analyses technological learning and innovation processes in firms in the United Republic of Tanzania by examining the performance of a broad set of enterprises, mostly in agro-industry sectors, ranging from affiliates of large foreign enterprises to SMEs and microenterprises (Box 6.9). Innovation is defined simply as product innovation when firms introduce products that are new to the

firms. Technological progress in small (agro-industry and other) firms is achieved through collaboration networks rather than through investing in new equipment, human capital, formal training, or by investing in access to knowledge systems as with large firms. Local firms in the United Republic of Tanzania, in contrast to affiliates of international companies, collaborate more with other local firms than with foreign firms in the country, while foreign firms collaborate more intensively in terms of backward linkages with other foreign firms (ibid).

The relative weakness of in the United Republic of Tanzania in its agro-industry sectors and agribusiness firms in promoting internal technological learning and acquiring technological capability by investments in new equipment is explained also by inadequate public R&D, low private R&D spending, and weak training, extension, business and technical support systems. All types of (public and private) extension services for the firms, in the form of support institutions which can be easily accessed to give advice on new technologies and on new equipment, are weak. Evidence from across the country suggests that management capacity, R&D spending, extension services and training are crucial to business success and to steady productivity improvements in these sectors (Goedhuys et al. 2008). Also important is the intensified dialogue of public research, training and extension institutions with the private enterprises (and respectively with their associations) on reforming and adapting the research agenda, the delivery of extension services, and the content of training programmes. Examples from Kenya and Ghana show that this can be done successfully. The Kenya Industry Research and Development Institute (KIRDI) and the Ghana Regional Appropriate Technology Industrial Service (GRATIS) illustrate what can be done to strengthen expertise in enterprises (OECD 2008). GRATIS, a network of technology transfer units throughout Ghana, is promoting grass roots industrialization by providing consultancy services and training for micro and small-scale enterprises.

But experience in the United Republic of Tanzania demonstrates just how difficult it is to make such institutions relevant for agribusiness when private support and commitment are lacking, and when they are overly dependent on government and donors (Wangwe *et al.* 2009). Rwanda's strategy to develop institutions for the development and diffusion of appropriate technologies is embedded in a holistic strategy to promote STI-based agro-industrial development, supported by fostering the necessary capacity and capabilities (Watkins & Verma 2008). Attempts to make such institutions locally-based, by reaching out to remote areas and to small firms, and demand-driven, in the sense of responding to market signals and needs of enterprises, are underway.

Box 6.9: Technological learning, product innovation and collaboration in Tanzanian agro-industry

The probability of being an innovative firm in the United Republic of Tanzania depends on the characteristics of the firm (size, age, sector, ownership), on the use of the various technological learning activities by the firms, and on the intensity of collaboration with other firms in product development (Goedhuys 2007). Innovation is defined as the introduction of products that are new to the firm. Goedhuys (2007)

surveyed important leading industries ranging from commercial farming and agro-industries to chemicals, metal working and construction materials.

The results reveal that technological learning takes place in a context-specific way - the sector of activity, the size of firms, the age of firms, and the form of firm ownership all matter for the particular form of learning. In particular, enterprise size is very important for learning, as all technical learning variables are strongly related to size.

Larger firms have higher skill levels, more formal training, greater R&D activities, higher internet connectivity, and higher investment levels than smaller ones. Foreign firms outperform local ones in all learning activities, although the difference is not significant for the skill level of the workforce and for the R&D and design activities. Foreign firms invest more in new equipment, are better connected, and train more workers more intensively. Smaller firms generally acquire technological capacity in less resource-intensive ways, relying on collaboration with competitors, customers, suppliers, and collaborating with various other agents in the knowledge system where they have access with low cost. Local firms are active in their use of in-house R&D, study tours, trade fairs, and in the collaboration with suppliers and customers. They also imitate competitors and source more from domestic universities than foreign firms. As a result they are better embedded in the local production structure. Medium-sized firms are more innovative, followed by large and small firms.

The results show that firms of a smaller and larger size in the United Republic of Tanzania are innovative according to the definition used above, but that they innovate on the basis of different channels of technological learning and different forms of collaboration with firms and other actors.

Source: Goedhuys (2007)

Innovation capacity

There is increasing evidence from investment surveys, case studies and sector analyses that the innovation capacity of African firms, also in agribusiness, depends on the country characteristics, firm characteristics, modes of technological learning available to firms, and on the forms of collaboration between a firm and other related firms and public actors. The propensity to innovate via introducing products that are new to a firm is heavily dependent on the size of firms in the United Republic of Tanzania. Goedhuys (2007) shows that the probability of being a product innovator is highest with medium-sized firms (30-99 employees), then followed by large firms (100+ employees) and small firms (ranging from 10-29 employees), while microenterprises are according to this definition of product innovation the least innovative firms. This does not mean that microenterprises are not innovative, as they make innovations in processes, upgrade their established product lines, and innovate in organization and marketing in order to survive.

Governments in Africa wishing to support broad-based innovation can support all enterprise sizes from micro to small and then from medium to large-sized firms with a portfolio of instruments and institutions adapted to these sizes. There is a case for locating industrial technology and innovation centers providing extension services as close as possible to micro, small and medium-sized enterprises, while large firms are better placed to access knowledge through their connectivity and their greater human capital base.

Although being innovative, SMEs are at a serious disadvantage because of finance constraints, while larger and foreign firms can more easily promote internal technological learning activities and have access to formal finance systems. Smaller firms may compensate their finance disadvantage to some degree by networking and collaboration to secure market information and to introduce new products. The key drivers of local firms' product innovation are the Internet, internal R&D, and intensive collaboration, while foreign firms exploit the superior skill levels of their workforce, production links with foreign parents, and greater investment in machinery and equipment (ibid).

The technology, logistics, and finance gap between foreign and local firms in the United Republic of Tanzania and as well in other parts of Africa is so great that there is limited interaction between the two groups. Public policy could support both groups to enhance innovation capacity of firms; foreign firms could be encouraged to train more local personnel, while local firms could get support in their particularly used technological learning activities. Innovation capacity at firm level can be promoted by focusing on avenues for technological learning activities and on ways and means for networking and collaboration.

A comprehensive public policy agenda could address the issues of promoting the technological learning channels and of financing innovation and applied R&D for local firms near enterprise level, while also fostering inter-firm links of domestic firms with foreign companies to supply the growing 'markets of the poor' (ibid). UNIDO (2002) gives a full account of the business and technological support institutions that may be helpful in this respect to the smaller enterprises. Although many African countries have such institutions, they are not adequately linked to smaller enterprises, which however is essential for the promotion of agribusiness. Reorientation of these support institutions towards smaller firms is crucial for agro-industrial development.

There is also increasing evidence on the determinants of innovation capacity in agro-industrial value chains. Innovation impulses in value chains are not restricted to foreign investment activity and foreign governance of the chain, but can be driven from below by local producers, intermediaries, and processors (chapter 4). To compensate for the obvious failure of public policy in many African countries to support African producers in the value chains, through public goods such as R&D, training and extension services, private sector-driven initiative and coordination are needed. Although the evidence suggests that prevailing value-chain governance mechanisms control the innovation processes ('top-down innovation pressures'), domestic producers and actors in the national innovation systems can play a role by stimulating 'bottom-up innovation initiatives'. Case studies of six African countries and for a wide range of agribusiness products (Larsen *et al.* 2009) show how innovations are taking place at various levels within the chain.

On the basis of these country and product case studies, it is possible to compare staple food value chains (cassava and maize) with high-value export crop chains (coffee), high-value horticulture chains (Ugandan green peppers and Kenyan tomatoes), and fish and livestock value chains (in Uganda, Kenya, and the United Republic of Tanzania). These analyses point to a considerable endogenous potential for

innovation in most of the value chains, showing too that most or all actors along the chains are involved in the process to some extent, thereby contributing to a growing innovation capacity. Participants adapt to the innovations of others by improving and restructuring products, processes, marketing strategies, and organizational design. However, the analyses also reveal that the coordination mechanisms in the value chains are varied, giving rise to different impacts on innovation capacity. Box 6.10 examines the eight main determinants of innovation capacity in agro-processing value chains.

Since agro-industry value chains in Africa have increasingly taken on a regional dimension, there is obvious potential for regional cooperation in public research and development, training and extension, logistics and technology support institutions. Case studies of the United Republic of Tanzania, Kenya, and Uganda illustrate how agribusiness firms (input suppliers, equipment and spare parts producers, transport and logistics companies, ICT firms, and quality testing companies) being involved in innovative activity have been forced to go regional to increase their sales and to procure better suited inputs and services (ibid). Some firms in the United Republic of Tanzania have extended their operations to new markets in Mozambique and Malawi.

Building national and regional value chains should go hand in hand as they are mutually reinforcing in respect of scale economies in input and machinery industries, as well as shared infrastructure, such as technology support institutions (UNECA & African Union 2009). Regional value chains will not develop in the absence of the necessary prerequisites – infrastructure, political cooperation, and coherent and consistent regional economic policies. COMESA's comprehensive leather sector strategy is designed to create a regional livestock and meat value chain. The strategy encompasses quality improvement, skills development, the promotion of clusters, and the support of producer organizations.

Most important, at both national and regional levels, are measures facilitating the access of actors of the agro-industry value chains to knowledge institutions for training, further education, extension, research and development, and technological development. Weaknesses in this process are major constraints on innovative-ness, productivity and competitiveness (Zeng 2008).

Box 6.10: Determinants of innovation capacity in agro-processing value chains

- *Demanding markets:* Exports to regional and overseas markets and supplies to large domestic customers, like supermarkets and hospitals, force producers to improve quality and adapt to the consumer preferences.
- *Standards and regulations:* Quality standards and environmental regulations force the actors to upgrade in order to qualify for market access. In the fish industry export processors have joined forces with other value chain participants to ensure the quality along the entire value chain.
- *Public-Private Partnerships:* Dialogue between the public and the private sectors on policies and legislation is important for dynamic value chains to achieve the optimal division of labour between the two sectors in supplying the infrastructure, the services and the public goods being central to enhancing innovation capacity.

- *Innovative financing mechanisms*: New private sector financing mechanisms at various stages of the value chain are facilitating technological upgrading and innovation, contributing to the scaling up of production and processing (such as finance from fish processors to fishermen, finance from seed companies to farmers, finance from milk collectors to milk farmers).
- *Associations of producers and processors*: These are important in all agro-industry value chains—to lobby for adequate public policies, to compensate for deficiencies in the provision of infrastructure and the supply of public goods, and to initiate innovation platforms by self-regulation of quality standards and environmental protection standards.
- *Access to knowledge institutions*: This is very important for the upgrading of agro-industry value chains. Direct and indirect measures are needed to facilitate the access of all actors in the value chains to these institutions (for research, training, further education, extension, industrial and technological support), and to transform the value chains at all stages into learning ventures.
- *Chain-wide profitability*: This is a prerequisite for technological upgrading, for value addition at all stages of the value chain, and for a further integration of the value chain from raw materials supply to the final consumer (this is already the case for high-value export value chains and some few domestic value chains, like coffee, fish, milk, and horticulture products, only).
- *Coordinating institutions*: These have to be strengthened in order to increase the innovation capacity in agro-industry value chains. Coordination can be exercised by lead firms, by producer organizations, by standards-setting and regulating bodies, by processors, and even by NGOs. Case studies show that some value chains have a functioning coordinator as in the cases of fish export processors or the milk collectors.

Learning and innovation in clusters

Technical learning and innovation processes in clusters are increasingly important for Africa's agro-industrial development. In Ethiopia exporting firms operating within clusters have had positive STI spinoffs of technical learning and innovation to other firms within the cluster, with evidence showing that all firms in the cluster, not just exporters, benefit from a higher export orientation within the cluster (UNIDO *et al.* 2009).

African policymakers can learn from the experience of agro-industry clusters in China and Peru where technical innovation centres have fostered technological progress within and between firms. Peru set up technological innovation centers (TICs), organized around clusters of firms specializing in agro-industrial production and supported and governed by NGOs and producer organizations. In South China the TICs were supported by local governments anxious to increase local value addition, attract new industries and foreign capital, and foster SME development. Subsequently the centres were refocused as 'marketized research centers' (MRCs) to make them becoming more market-oriented, as product development and marketing became more important for spreading R&D output to firms (Graham & Woo 2009).

Clusters are a means of tackling Africa's 'missing middle' problem by compensating from the disadvantages of SMEs by collective learning, joint action, shared infrastructure, and external economies. Case studies of agro-industry textile and wood clusters in Kenya, clusters for furniture manufacture in Egypt and the United

Republic of Tanzania, and clusters for fish processing in Kenya and Uganda demonstrate that spontaneously developed, rather than created, clusters and clusters in towns, rather than in rural areas, generate greater knowledge flows and have more innovative activity (Oyelaran-Oyeyinka & Mc Cormick 2007). Access of agribusiness clusters to knowledge institutions is a key factor in Nigeria and South Africa (Uzor 2009; Zeng 2008).

The potential STI benefits of clustering cannot be taken for granted and generalizations frequently mislead. Mere co-location of firms, such as in the Ugandan fish clusters, does not necessarily lead to skills upgrading, nor will clustering, on its own, achieve STI gains in the absence of complementary inputs, like finance, training, and R&D, and of demanding customers that stimulate technological learning by insisting on enhanced quality, environmental and sanitary standards. Furthermore, there are some instances where powerful business actors in clusters have used their muscle to block knowledge flows and innovation, while in other cases, cluster leaders have enforced innovation, learning and upgrading. All of this suggests that while governments should avoid 'forcing' cluster formation, a cluster development agenda that focuses on training and generating technology spillovers, while providing incentives for collaboration in facilitating knowledge flows in the cluster, is essential (Oyelaran-Oyeyinka & Mc Cormick 2007; Zeng 2008).

6.5. Frameworks and tools for agro-industrial innovation systems development

National innovation systems (NISs)

Although NISs are used increasingly to restructure STI systems in Africa, only South Africa has an established NIS (Box 6.11). For agro-industry development, the establishment of NISs will have an important guiding role highlighting the need to accelerate the process. However SANE countries, which already boast a comparatively strong diversified industrial base populated by large internationalized companies, are accelerating STI infrastructure and agro-industrial development and have the greatest chance to make progress with their NISs. Over two thirds of the 1,000 largest African enterprises are based in these four countries,³³ as well as 30 out of the largest 50 African banks and most of the African major agribusiness firms (World Economic Forum. *et al.* 2007; OECD 2008). The mapping of African agribusiness firms shows a heavy concentration in the SANE economies (OECD 2008)

Five pillars are central to NIS development (Box 6.12), the most important of which is the enterprise sector, since it is the manner and extent to which enterprises develop or adapt new technologies, in part by responding to the opportunities provided by other pillars, that ultimately drive firm-level innovativeness and productivity (Wohlmuth, 2000).

Public policy has a crucial role to play in providing the incentives necessary to generate interaction between the five pillars. A wide range of incentives can be introduced and used at national and regional levels, including matching grants to link

33. South Africa, Algeria, Nigeria, and Egypt

R&D institutions and enterprises; temporary subsidies to support links between private and public R&D institutions; facilitation of developing and registering trademarks and local brands; prizes and competition awards; public procurement measures; tax deductions for private research and development expenditures; reorienting public R&D institutes and technical and industrial development and training institutions to the demands of enterprises; allocating funds for market research; export promotion and trade fair participation.

Box 6.11: South Africa's National Innovation System (NIS), agro-industry development and global competitiveness

In terms of quality and comprehensiveness the South African national innovation system (NIS) is increasingly moving towards an innovation stage of development according to the methodology of the Global Competitiveness Reports. The overall research intensity (expenditures on R&D/GDP) being at 0.87 per cent is just below the one per cent target the country has itself set, while being still higher than those of Argentina and Greece. With 17,910 researchers—1.6 per 1,000 of total employment—South Africa compares favourably with the ratio of 1.2 for China. The business sector accounts for 58 per cent of total national R&D expenditures, and there is also a strong basic research component in R&D. Innovation funding is expanding, and the National Advisory Council on Innovation (NACI), established in 1997, is responsible for the strategic direction. The government has developed specific development strategies for various technology sectors, with priority accorded to competitiveness, geographic advantage, and indigenous knowledge. Biotechnology is a priority sector and may help in the future transformation of agribusiness.

However, the weak human capital base is a serious constraint. A second major weakness is the incompatibility between some aspects of STI strategy and broader economic development policies. The ASGISA Strategy (Accelerated and Shared Growth Initiative for South Africa) of February 2006 does not adequately consider the binding constraints on innovation resulting from other policy areas, such as a volatile exchange rate, transport and infrastructure bottlenecks, the scarcity of skilled labour, and the limited competition in core sectors.

Other snags include the burden of official regulation, the heavy emphasis on STI-learning rather than Doing, Using, Interacting (DUI)-learning, severe administrative problems, and a failure in respect of the delivery of certain public goods. All this also affects the agro-industry sector of the country.

Sources: Jafta & Boshoff (2008); Hanekom (2007); Department of Science & Technology (2006)

Box 6.12: National innovation system: The key pillars

1. The enterprise sector—farms and firms of different size and ownership—is the central pillar.
2. Research and development, education, training, and other skills development institutions.
3. Innovation finance institutions.
4. Intellectual property protection agencies and technology and business support systems.
5. Public regulatory agencies for company registration and licensing, environmental protection agencies, and agencies for property protection and land use issues.

Linkages between and within the key pillars are important. Enterprises can benefit in terms of innovation capacity from strengthened links so that their options for upgrading and productivity growth are widened and deepened. A significant number of African countries have such institutions, but they are not yet linked among themselves and especially not with the enterprise sector. Small African countries could benefit from some regional coordination of innovation systems, so as to reap benefits from scale economies, but there will be resistance to give up the establishment of basic institutions of the pillars in a country. Coordination and specialization between these institutions are therefore important elements of future integration efforts in Africa. For broad-based agro-industry development the five key pillars are of central importance, as well as the linking of them. The African NISs also have to be open to respond to new developments in other countries, and to attract knowledge flows from outside, especially from foreign enterprises, mobile skilled manpower and from foreign universities.

Financing of all this is possible by setting new priorities for spending domestic (public and private) funds and donor funds. The existing policy framework in Africa is not up to the challenge and in the 19 SADC-plus countries only South Africa has created incentives to link the five pillars; only Kenya and South Africa have attracted R&D activities from foreign agricultural and pharmaceutical biotechnology companies, while only South Africa has a programme to make private R&D investment tax deductible by 150 per cent on expenditure on scientific and industrial R&D if aligned to national STI priorities (Mugabe 2009).

Public policy incentives are needed also to ensure that Pillar Two institutions (R&D institutes, education and skills development institutions) are more responsive to the demands of enterprises. In Africa existing incentives are both inadequate and largely ineffective, even in reforming countries, such as in the United Republic of Tanzania where the industrial and agricultural R&D system falls well short of private sector requirements (Wangwe *et al.* 2009). Institutional weaknesses are exacerbated by insufficient public funding, the dominance and volatility of donor funding, the lack of continuity, transparency and predictability of R&D funding, and the absence of a strategy and of a domestic ownership of the R&D agenda. In the United Republic of Tanzania, for instance, the value of services provided to businesses of public research institutions is questioned by the majority of potential users. There are some public-private R&D partnerships in areas where large-scale and commercial farmers operate, and where producer associations, such as the Tanganyika Coffee Growers Association (TCGA), can negotiate with government on topics such as pricing, credit and infrastructure, but the impact on the overall R&D system is limited. There are also some private research institutions for coffee and tea producers, but the majority of food crop producers and some minor cash crops depend on the public R&D system that is not very responsive to the demands of agribusinesses. This is a two-sided problem: the demands of enterprises do not readily translate into public R&D responses, while on the supply side the output of R&D institutions cannot be readily commercialized and sold to the productive sector.

Education, training, and skills development agencies are of crucial importance for a functioning NIS but education levels are poor. The enrollment rate in tertiary

education for science and technology is very low (28 per cent of the total; see Mugabe (2009)). Technical and vocational training is very weak in most of Africa, despite reforms in countries like the United Republic of Tanzania, which have had only a modest impact (Utz 2006). Some countries like Ghana and South Africa have developed specific policies to promote the collaboration of universities with the private sector, but for the group of the 19 SADC-plus countries, such examples are rare (Mugabe 2009).

ICTs and availability of skilled human resources are essential for the integration of the various pillars of the NIS. The United Republic of Tanzania has made some progress with its National ICT Policy and the 1997 National Telecommunication Policy. Studies show that farmers get higher prices through the use of mobile phones. Small businesses across the country benefit from public and related private ICT investments, while agribusiness has also benefitted from relatively comprehensive Internet service in the United Republic of Tanzania (Utz 2006).

It is as well necessary to highlight the degree to which agro-industrial development in Africa has been constrained, because financial support for innovations has been inadequate. Pillar Three of the NIS, innovation finance institutions, focuses on one specific aspect of this problem - innovation finance. Separating this crucial aspect from the overriding problem of STI development poses a number of difficulties. Such are the vagaries of climate, global markets and national policies that agricultural investment tends to be a high risk activity, and this is more so the case for innovation financing and investment along agro-industry value chains. Consequently, funding is scarce and firms have to look beyond traditional sources of finance, such as bank lending, to venture capital companies, microfinance institutions, diaspora funds, NGOs and donors, and particular government funding institutions. However, in some agro-industry value chains with high-value products, new private financing techniques proliferate, especially from processors, exporters, collectors, owners of warehouses, and from large buyers like supermarkets.

Unfortunately, the private equity industry, commercial and development banks, microfinance institutions, and donor funding agencies have not paid adequate attention to the financing of such innovations. Venture capital, tax relief and other instruments to provide finance for innovations are not available for universities, SMEs, and R&D institutions, but recently some new funding institutions have been developed in South Africa, Uganda, and Ghana (Mugabe 2009). South Africa's innovation finance system may be the most developed in Africa, but still it does not reach satisfactorily SMEs and many agribusinesses. There are also new institutions for SME support in the United Republic of Tanzania with some financing windows, but it is unclear how innovative projects are selected and whether entrepreneurs can access finance for their perceived innovations (Utz 2006).

There is, however, a growing awareness that innovation financing is a key factor for agribusiness development. Countries such as Botswana, Ghana, Rwanda, Kenya, Mozambique, and South Africa have realized that innovation financing is important and that this aspect has to be part of the national STI policies (Mugabe 2009). In 2007 Botswana set up the Botswana Research, Science and Technology Investment Agency to finance innovation, while in South Africa an Innovation Fund (IF) and

the Technology and Human Resources for Industry Programme (THRIP) operate under the wing of the National Research Foundation (NRF). Innovation in South Africa is also promoted by the recently-established Technology Innovation Agency (TIA) and the Industrial Development Corporation (IDC).

A number of other countries—Ghana, Kenya, Uganda and Zimbabwe—have created innovation funds, but on the whole the innovation finance field is crying out for reform and for new initiatives, especially for financing innovative agro-industrial development (*ibid*).

Pillar Four, intellectual property offices and technology and business support systems, of the NIS is weak in most of Africa, but the Ethiopian Intellectual Property Office (IPO) shows what can be achieved by linking up with enterprises and public agencies so as to create umbrella brands for fine coffees and to upgrade the sector. Value can be added for many agricultural and agro-industrial products by improving the links to IPOs. The 19 SADC-plus countries that are members of the international IP Organizations and Conventions and of African Regional Intellectual Property Organization ARIPO have intellectual property laws and institutions, but many of these are outdated, having been drawn up in the 1960s and 1970s. Botswana, Ghana, Kenya, South Africa, and Zimbabwe revised their patent legislation in the 1990s and in the 2000s (*ibid*). Only a few countries (Kenya, Mauritius, and South Africa) have active industrial property offices or organizations that are properly staffed and equipped (*ibid*).

The Ethiopian Intellectual Property Agency highlights the importance of trademark registration, specifically the organizing of coffee producers and other stakeholders under an umbrella branding initiative. However, as noted above, the other critical factors for export success have also to be met in Ethiopia. Although some countries such as Malawi and Zambia are making progress in the trademark field (UNCTAD 2006), much more needs to be done to strengthen this pillar, especially by moving to subregional cooperation in intellectual property protection.

Still unexploited too is the huge potential for grass roots innovations and the commercial value of indigenous knowledge (Mugabe 2009; UNIDO 2006a; But 2006). Annual production in Nigeria's informal agricultural sector, using indigenous methods and techniques, is valued at \$12 billion, providing a living for 81 million people (But 2006). Unfortunately, dissemination of such innovations is poor and new policy initiatives are needed to ensure the spread of these technologies across the sector. South Africa's new STI programmes include measures to fund, develop, and disseminate grass roots innovations and make them part of the NIS. Markets are increasingly identified and developed by using traditional health knowledge for pharmaceutical drug firms, while bio-prospecting firms could be established for the benefit of and controlled by local producers (Mugabe 2009).

Technological support systems and business support services include basic industrial services; technology information services; metrology, standards, testing, and quality control centres; productivity centres; technological extension agencies; and research and development laboratories (UNIDO 2002). A wide variety of such systems already exists in Africa (*ibid*), but interaction with the enterprise sector and with other pillars of the NIS is mostly very weak. Technology infrastructure in the

form of standards setting, quality measurement, and metrology institutions plays a critical role in developing competitiveness at enterprise level while also contributing to value chain development and clustering. Most of the 19 SADC-plus countries already have such organizations, though quality standards vary and many of these bureaus lack equipment, staff and funding (Mugabe 2009). Most important, they are not effectively linked with the enterprise sector and other public agencies.

Usually small and informal enterprises are not linked to this pillar, while export-oriented large and foreign-owned enterprises and value chain leaders have developed their own private voluntary standards (PVSs) and their own technology infrastructure, making little use of these public services. Therefore, much more could be achieved through higher participation and greater collaboration. The United Republic of Tanzania is a striking example of the need for closer links to other pillars on the NIS. In 1994, it established a Centre for the Development and Transfer of Technology (CDTT) to coordinate capacity-building activities, promote the adoption of new technologies, strengthen R&D, and facilitate information exchange and extension services (Utz 2006). But its work is largely unrelated to the needs of enterprises, while the Small Industries Development Organization (SIDO), the National Microfinance Bank (NMB), and the recently established SMEs Credit Guarantee Scheme suffer from the same shortcoming. Their functions include advising and funding SMEs, training staff for small businesses, and supporting producer associations. They were set up to bridge the gap between R&D institutions and technical innovation centers (TICs) like the CDTT, while also providing links in the form of extension, consultancy, and advisory services to the SMEs.

To improve the linkages between the technological and business support institutions and the small enterprises in Africa, the UNIDO Cluster and Business Linkages Unit has developed various instruments that link SMEs and microenterprises to large scale business and to support institutions. The UNIDO programme components for SMEs on Clusters and Networks, ICT, Corporate Social Responsibility, Business Partnership, and Export Consortia could thus be extended in scope, as a framework for increasing the innovation capacity of SMEs and microenterprises. For UNCTAD's Centres for Innovation and Enterprise Development (CIEDs) three tools designed specifically to support SMEs are suggested. These are (a) a change assessment and screening tool (CAST); (b) a general information-seeking tool (GIST); and (c) an in-depth enterprise assessment system (IDEAS).

There is still a great scope for linking enterprises with technology support institutions at various levels, and this is especially important for agro-industrial development. A possible way forward in Africa is a switch from the route of publicly-supported business and technology support services to public-private partnership institutions, moving thereafter to market-driven services, which are supplied by private technology and business services providers. A wider range of specialized engineering firms, business consulting firms, and technological services companies will follow from developments initiated by greater interaction among the five pillars of the NIS.

For agribusiness SMEs, extension services along the lines of National Cleaner Production Centres (NCPCs) are required. These centres are becoming increasingly

important because of the many and severe environmental problems associated with agro-industry development. Technology development and environmental protection can be promoted more widely, which is also an issue of the fifth pillar.

Issues related to Pillar Five, public regulatory agencies for company registration and licensing, environmental protection, and property and land use issues, are probably the most neglected aspects of NISs in Africa. Successful innovation and upgrading in agribusiness is possible only where coherent and transparent public regulations are in place. The Africa Competitiveness Reports 2007 and 2009 (WEF et al. 2009) provide detailed assessments of the current regulation of product and factor markets in Africa. The weaknesses, shortcomings and the abundance of conflicting regulations have a negative impact on agro-industry development (Larsen *et al.* 2009; OECD 2008; FAO 2007b).

Efficient regulatory institutions and agencies are required to manage technology procurement and licensing, environmental impact assessments, the registration of companies and of land ownership, the certification of standards and qualities, and the licensing of new products and processes, especially drugs, medicines and foodstuffs. Where these institutions do not exist or are ineffective, innovations are stifled (Larsen *et al.* 2009; Zeng 2008; Oyelaran-Oyeyinka & Mc Cormick 2007; Goedhuys 2007; Wangwe *et al.* 2009; Utz 2006).

Property and business registration institutions, environmental protection agencies, and land use regulatory institutions are increasingly important for agro-industrial development. The raw material shortages currently witnessed in Africa (e. g. in cocoa, cotton, timber, and fish) seriously affect agro-industrial development and agribusiness. Environmental degradation associated with unregulated agro-industry activity, as well as the unprecedented scale of purchases of African land by foreign companies show that regulation is central to agro-industry policy. Regulations for biotechnology and in other new science and technology fields are also required, while much existing legislation and regulation should be amended or updated.

From the above, it is clear that policymakers need to examine all the five pillars with a view to discovering how best they, and interactions between them, can be strengthened. It appears that Africa's weakness lies not in the absence of institutions, but their ineffectiveness and unsuitability in a modern high-technology environment and very weak interaction between them.

Linking national with sector-wide and subregional innovation systems

The charters and treaties of Regional Economic Communities (RECs) in Africa contain provisions for the subregional promotion of STI with the aim of enhancing efficiency, exploiting specialization and the division of labour, avoiding duplication and securing scale economies in R&D (Mugabe 2009). For these lofty aims to be translated into effective regional innovation systems (RISs), the five pillars of the NISs must be coordinated at regional levels.

Some action on this front has already been taken, such as the AU/NEPAD Science and Technology Consolidated Plan of Action (CPA), being tasked with creating the R&D, science and technological infrastructure necessary to realize the

CAADP's ambitious goals. The African Biosciences Initiative (ABI) with hubs across the continent has a role to play in boosting agricultural production, while tertiary education and R&D institutions of Africa-wide importance are supported by the African Development Bank (AfDB) and others. The CPA for Science and Technology has identified certain 'flagship' programmes for Africa with relevance for agro-industrial development, but these have yet to be operationalized (ibid). The AU/NEPAD flagship programmes include research on post-harvest technologies, biodiversity and biotechnology, R&D in indigenous knowledge, energy, water supply, and desertification (AMCOST 2009). CAADP sets out proposals for a Strategic African Commodities Initiative (Economic Commission for Africa (ECA) & African Union 2009); also this initiative needs tremendous support by STI inputs.

A number of subregional initiatives of direct relevance for agro-industrial development are also underway, such as SADC's moves towards building a regional innovation system. South Africa plays a role in it, and some progress is visible. COMESA has made proposals for a regional value chain strategy for the livestock, skins and hides, and leather sectors, and further regional initiatives are underway also in East and West Africa. All these initiatives have more or less important STI components. However, some of these regional African initiatives are highly donor-dependent; they are mostly focused on R&D programmes and are only weakly related to technological development and innovation in enterprises, so that they will not have a quick impact on the enterprise sector. They need to be complemented by private sector-led regional STI cooperation and as well a more demand-driven regional R&D strategy. Large African companies in agro-industry fields could be encouraged to take a lead role in this effort that should also bring in producer organizations and farm cooperatives because at this juncture, the existing elements of NISs and RISs are too remote from the private enterprise sector. Similar observations apply to the subregional Agricultural Research & Development (AR&D) systems in Africa (Nienke & Stads 2006). Despite closer networks and more intensive linkages, there is still a wide gap between agricultural R&D institutions and private agribusiness enterprises that must be narrowed by building linkages at regional level and using the services of applied research institutes, industrial and technical innovation centres, and training and extension services being available in the region.

6.6. STI infrastructure and building human capabilities

A combination of factors - especially weak education systems and training institutions and an underdeveloped STI infrastructure—are to blame for the continent's technological backwardness (Oyelaran-Oyeyinka & Barclay 2004). Past policy failures and serious gaps in the education system and in the R&D systems affect the level and the quality of tertiary education and the depth and comprehensiveness of the STI infrastructure. This has severe consequences for agro-industrial development. Agricultural Education and Training (AET) systems in Africa show declining enrolment profiles, isolated and fragmented institutions, obsolete curricula, crises in staffing, and outmoded teaching methods and facilities (World Bank, 2007b). Consequently the human resource base for agro-industrial development is very weak (see also UNIDO 2009b).

Recognizing this some African governments are making human resource development for STI, especially for R&D, agricultural education, extension and training, a policy priority (Nienke & Stads 2006; Mugabe 2009; World Bank 2007c). Rwanda, a country recovering from civil war, offers lessons for other countries. The Rwandan authorities have carried out a careful analysis of the STI infrastructure for the food-processing industry, assessing human resource constraints influencing production, marketing, quality control, and standardization; and on this basis recommendations for education and training were made to supply the STI services needed in the industry (Watkins & Verma 2008). This analysis was then extended by an assessment of the STI requirements and the related human capital needed for the production of value-added exports, predominantly agro-products and agro-processed goods. The human factors hampering the development and the dissemination of new technologies were emphasized, and the role of specific STI and training institutions of the country was assessed in the context of Rwanda's agro-industrial development perspectives. Practical action and detailed reform programmes were suggested for building human capabilities and institutional capacity at technical innovation centres and vocational training institutions, along with innovative R&D and technology financing schemes (Box 6.13). Similar initiatives in other African countries could form the basis of programmes for developing STI infrastructure and building human resources capacity that are directly linked to agricultural and agro-industrial development plans.

Box 6.13: Food processing in Rwanda: Building human capabilities and developing STI infrastructure for agro-industry development

The building of human capabilities for the STI infrastructure and the effective linking of the agro-industry to R&D, extension, education and training institutions and to industrial and technological innovation centers are important components of Rwanda's comprehensive capacity-building strategy. To develop a programme for the food industry a situational analysis was undertaken that identified key constraints, especially the shortage of qualified technical and managerial personnel and of professionals to staff the research, education, vocational training, environmental protection, and business and technical support institutions.

The initial situation was highly unfavourable. Business management skills are very scarce and industry faces severe quality and environmental problems. The marketing of processed food products is constrained by poor quality, the scarcity of appropriate skills and expertise, inadequate technology, and the high cost of packaging materials. There is potential for regional and global exports of fruit juices, banana fiber, dried fruit, and honey, but to exploit these opportunities the Rwanda Investment and Export Promotion Agency itself needs skills and expertise. The most pressing challenge is that of ensuring that producers increase volumes while improving quality. Reform programmes are underway to change the curricula and the relation of the Kigali Institute of Science, Technology and Management to the food industry to ensure that students obtain practical experience. Technical, managerial, and professional expertise is needed at all levels with priority for agriculture and the food industry. Developing STI support at all levels and building related human capacity are crucial factors for the success of all these initiatives.

Source: Watkins & Verma (2008)

Important new technological learning and innovation platforms are emerging in Africa. Strengthening Capacity for Agricultural Research and Development in Africa (SCARDA) is an effort to reach out beyond the national borders and the subregional political entities. Producers and disseminators of R&D results (research and training institutions) and users of R&D results (producers and processors) are linked to one other in a novel fashion. SCARDA encompasses the most relevant actors and institutions for accelerating agriculture and agro-industrial development in Africa on the back of a common learning and innovation platform (von Kaufmann *et al.* 2009). The SCARDA approach and similar initiatives could contribute to the productivity revolution needed for the green revolution in Africa. Accelerating human resource development, developing STI infrastructure, facilitating cross-border flows of skilled labour and of STI professionals, and exchanging experiences in institutional capacity-building are centre pieces of regional integration.

Additional funding is essential for developing STI infrastructure and for building human capabilities, but STI-related aid is very small, covering only 0.4 per cent of total aid disbursements for research in LDCs, and 3.2 per cent of all disbursements for advanced and specific human skills. Aid for STI in agriculture and agro-industry is inadequate for the systematic support of enterprise learning and innovation needed (UNCTAD 2006), and urgent steps should be taken to increase this donor support.

Besides additional funding, new approaches are needed. UNIDO has developed a comprehensive strategy for building industrial capabilities for catching up in technology assimilation and competitiveness by improving business access to knowledge systems, strengthening links between businesses and knowledge institutions, and building entrepreneurial capabilities in such fields as standards and regulations, and food safety (UNIDO 2005). All these issues should become part of aid to STI, especially in the form of support for closer linkages across the country among enterprises with a different knowledge capital and between businesses and knowledge systems.

Agro-industrial development policies in Africa will—in order to realize sustainable successes—also depend on substantially increased donor support for stimulating innovation directly at the enterprise level. Also, more financing of aid for trade programmes will be helpful to enhance technological learning by increased export activities. Unfortunately, recent trends in aid to agriculture, forestry and fishing and to agricultural R&D have been unfavourable, and aid to agro and forest industries is extremely low (OECD 2008). The contrast between the large share of aid for agricultural administration and policy formation (20.9 per cent) and that for agricultural education, training, extension, post-harvest protection, and agricultural R&D (of only 5.7 per cent) is striking but also unsustainable (*ibid.*).

In sum, aid designed to develop STI infrastructure and to build human capabilities for agro-industry development and for linking agribusiness to modern knowledge systems is limited, volatile, and quite biased in structure. Aid is not much related to enhancing the links between enterprises (farms and firms) and R&D institutions, universities, and technological and business support systems that are so crucial to agro-industrial growth. All areas relevant to innovation in enterprises,

including vocational training, advanced technical and managerial training, agricultural education, and strengthening key technical support systems are poorly financed by donors, and a more strategic orientation of aid policies for STI is therefore needed (UNCTAD 2006).

Developing STI infrastructure and building human capabilities are tasks for national governments and donors to be undertaken jointly. Coffee sector development projects in Rwanda could be a model for future action by donors. The Partnership for the Enhancement of Agribusiness in Rwanda (PEARL) project, supported by the United States Agency for International Development (USAID), has stimulated new forms of cooperation between farmers, sellers and researchers (from the National University of Rwanda). The gains in terms of higher coffee prices—derived from STI inputs into the Rwandan coffee sector have been considerable: the price for a kilo of unprocessed dried coffee increased from \$0.22 to \$2.00 in the project period 2001 to 2006; however this is obviously related to both market developments and project actions. A follow-up programme, Sustaining Partnership to Enhance Rural Enterprise and Agribusiness Development (SPREAD), started in 2007 and is supporting the second-level effects, such as coffee roasting and spin-off enterprises that will increase value addition in the Rwandan coffee industry (*ibid*). However, an inclusive approach is needed to cover all agro-industry subsectors, the support infrastructure, agricultural and industrial policy formation, and the related governance mechanisms (UNIDO 2002; UNIDO 2004; UNIDO 2005; UNIDO *et al.* 2009). On this basis development of STI infrastructure and building of human capabilities can be accelerated.

6.7. Conclusions

Public action to strengthen STI policies and the STI infrastructure is crucial to kick start the productivity revolution necessary for rapid and sustained agribusiness growth in Africa. Five major areas for policy action were discussed in this chapter, and these policy dimensions are relevant for all of Africa irrespective of the level of development and other country characteristics. Although there are great differences between African countries in terms of data coverage, awareness about necessary reforms, and about status in policy formation and policy implementation, all African countries can benefit from giving utmost consideration to these policy dimensions. However, all African countries will have to find their own way to initiate further reforms and to make progress with regard to these five policy dimensions:

First, more reliable and specific data and indicators are needed for new and better formulated STI policies, so as to achieve dynamic agricultural and broad-based agro-industrial development. New STI policies are required, because many African countries have not yet integrated this policy branch with other economic development policies. With appropriate STI data and indicators better formulated STI policies can be designed and implemented so that the framework for policy decisions is broadened. Data coverage and indicator systems to assess the STI base for agro-industry development must be strengthened as a means of enhancing the design and implementation of STI strategies. The STI indicator systems for the SANE-plus countries and the SADC-plus countries give a basis for progress in this direction, but these

systems have ultimately to be merged and extended to the other African countries, so that countries can benefit from comparing performance data. Extension is also needed to encompass the production stages and the value chain processes along the agro-industrial subsectors, and to capture the STI dynamics in the private sectors, especially in agribusiness. All African countries can contribute to a new STI environment and can benefit from the progress in other African countries, and even small and gradual improvements will lead to a gain for the policymakers.

Second, the conditions for converting comparative advantages into competitive advantages in agribusiness by using more fully STI inputs matter. Six critical factors for sustainable export successes were discussed in the chapter, and Africa can learn from successful agro-industrial producers and exporters in Latin America and Asia. Lessons include the adoption of appropriate public policies, intensified private-public sector collaboration, developing STI infrastructure and building human capabilities, and the creation of innovation platforms by producers and their associations themselves when forcing higher standards on their businesses. Although the initial conditions between African countries are highly divergent in terms of these six critical factors, all countries can improve on these by concerted public-private action, and even improvements in one or two of the areas would lead to overall progress in agribusiness. The key message is that STI inputs must be systematically incorporated into production and marketing along the agro-industrial value chain, but the STI agenda has also to be integrated into public policy and private sector management.

Third, improving technological learning and enhancing the innovation capacity in the enterprises, especially in agro-industry enterprises, are key issues for policymakers. Many possibilities exist for facilitating speed and scope of technological learning, and for opening new channels for technological learning, also for value chains and clusters. These can be exploited by new strategies. Eight determinants of innovation capacity were identified with regard of agro-industrial value chains in the chapter, and improvements can be facilitated by public policy and by private sector management. All African countries and their enterprises can make progress with regard to technological learning and innovation capacity, irrespective of their country characteristics. Country cases show that a low overall development level is not hindering progress, provided that public policy action and private sector management join forces. Coordination within value chains and collective learning in clusters give opportunities and determine the speed of innovation and the level of competitiveness. The evidence for the agro-industry value chains and clusters in Africa shows that quality and intensity of public-private collaboration matter for facilitating technological learning and for building innovation capacity; providing access to knowledge systems and intensifying the linkages with the STI infrastructure are key factors.

Fourth, African countries can support agro-industrial development and agribusiness by focusing on the major five pillars of the national innovation systems. The five pillars are in most of Africa only rudimentarily developed, but improvements are possible in all countries, to the benefit of agribusiness. Public action is needed to strengthen the linkages within and between the pillars, especially with the

enterprise sector. So far most of the African countries have not at all exploited the opportunities that exist in this regard. Even least developed countries can better interlink the enterprise sector with their research, training, extension and technology centres, or can use their intellectual property offices to interlink with enterprises for branding local products for value addition. More developed African countries like Morocco, Kenya and South Africa can do a lot to make the NISs become more dynamic and consistent with overall economic and STI policies. Institutions of the five pillars need to be upgraded and linked to each other, and even in South Africa the NIS and the STI policies can be more closely linked with national economic policies. Subregional and sectoral innovation systems are also emerging in Africa and can support the move towards new agro-industrial policies. Subregional innovation systems can help smaller African countries to strengthen their local institutions. Sectoral innovation systems at subregional level can also support local institutions needed for agro-industrial development.

Fifth, the objectives and strategies for building human capabilities and developing STI infrastructure have to be formulated at local and national levels by responding to the demands of the productive sectors, especially agro-industries. Donor agencies can play a role in this effort, although drastic changes in the direction of such aid are needed. All countries in Africa can embark on such strategies, even small least developed countries, which are rebuilding their infrastructure after civil conflict, like Rwanda, can do. Rwandan experience shows that a comprehensive STI-based rehabilitation programme for agro-industries is already contributing to recovery from the legacy of civil war. The human capabilities that are needed for the local and national STI infrastructure are assessed and steps at implementation are taken in the context of human resources development projects. Many African countries can learn from the way Rwanda reconstructs its STI infrastructure for agro-industrial development, especially for the food processing industry and the high-value agriculture export sector. Aid towards developing STI infrastructure and building human capabilities is marginal, and so a new orientation of assistance is urgently needed. While least developed African countries can benefit in terms of rehabilitating institutions and staffing their research, training and technology centres, countries like Morocco, Kenya and South Africa can benefit from measures to reduce their specific skills shortages, constraining development of STI infrastructure and of a more dynamic agribusiness activity.

A strategy for Africa rests on the interaction of these five policy dimensions. All African countries can improve the situation with regard of STI policies and infrastructure on the basis of their initial conditions, irrespective of the level of development and other country characteristics. However, a concerted implementation of reform programmes along these five policy dimensions is needed, involving the most important stakeholders for strengthening the STI infrastructure in Africa for dynamic agro-industrial development. Development of the STI infrastructure should not be confined to science and technology fields for agro-industry production; STI support is also needed for an effective linking of African agribusiness to global and regional markets, so as to stimulate technological learning, innovation and profitability in agro-industry.

7. Promoting effective and innovative financing

Jean Devlin and Patrick M. Kormawa

7.1. Introduction

In order for agribusiness development to act as the engine of economic growth for Africa, the sector requires capital; however, investment levels are frequently suboptimal, partly because the sector is perceived as risky and yielding unattractive returns. Net annual investment falls far short of the \$21 billion needed if the continent is to meet its food security concerns alone (UNIDO *et al.* 2010). Some multilateral efforts are underway to address this shortfall, including the recently-launched African Agribusiness and Agro-industries Initiative (3ADI), a joint initiative of the African Union (AU), UN agencies, and the African Development Bank (AfDB) designed to mobilize resources for investment in agro-food sector development in Africa. Traditional and innovative sources of financing that have impact at the enterprise level, and mobilization of large-scale resources, constitute one of the key pillars for agribusiness development in Africa.

This chapter provides a comprehensive examination of the challenges in agribusiness development financing, and lays out a set of measures to overcome these, focusing on the provision of financing in terms of capital for agribusiness development. In this regard, funding for fixed investment and working capital at a micro level, and access and availability of development financing for agribusiness at the macro level will be examined. The chapter follows the concept of value chain finance, examining funding issues at each stage of the agribusiness value chain.

7.2. Financing at the micro level

The private sector in Africa has not yet filled the gap in financing agribusiness

following the dismantling of the state-centred model of agricultural development and finance. The inability of banks to do so is closely tied to the characteristics of agribusiness that make lending at market rates to the sector difficult. The first major characteristic is the nature of their production, which is perceived as risky. Pests and adverse weather conditions make the supply of inputs less reliable; inputs are often seasonal hence variable, and there are storage and market risks. Poor infrastructure also leads to high operational costs for agro-industries.

Secondly, the majority of agribusinesses are SMEs³⁴, and this size compounds perceptions of risk by finance providers. It is generally known that SMEs face more constraints than larger firms in accessing formal finance (Beck *et al.* 2008). In particular, agribusiness SMEs in Africa tend to be undercapitalized, lack collateral, and have poor expertise in management, and in commercial and financial skills. Many border on informality, which adds a further layer of complication, as it is much harder to track their progress, and informal businesses tend to make little or no distinction between personal and business finances and may not keep any records³⁵. For banks, appraising and monitoring loans to such businesses requires analysing all aspects of the business, which is very costly and often may not be possible. Loan sizes must be sufficiently large to enable the bank to recoup this high level of transaction costs through interest rate margins or fees; however, the size at which this becomes viable may be too large for an agribusiness SME to absorb (Doran *et al.* 2009). Larger loan size also requires more collateral, which may not be available to agribusinesses in an acceptable form.

For all of these reasons, lending to agribusinesses in Africa often tends to be through informal networks, such as family and friends, supplier and other business relationships, or finance from customers through advance payments (Box 7.1). Whilst such sources of finance are flexible and fill a gap for agribusinesses, they also leave firms in a precarious financial situation that inhibits the long-term growth of the sector. The argument for focusing on formal finance lies in its effectiveness to “provide a wider range of services at a larger scale and offer a pooling of risks” which informal finance simply cannot (Honohan & Beck 2007, p.140).

Box 7.1: Spectrum of agribusiness finance

As with any business, all forms of finance for agribusiness and agro-industry will either be in the form of equity or debt, or a blend of both. These are distinguished by the order of legal claims, which investors hold for repayment in the event of an enterprise going bankrupt: senior forms of debt are the first to be repaid, with ordinary equity last.

Equity financing for SMEs often comes from family and friends, and can be limited. Other sources of equity financing can come from equity funds (e.g. venture capital, private equity).

34. As the definition of SME varies from country to country, and institution to institution depending on the basis (e.g. number of employees, volume of turnover, investment type etc.), as well as the minimum and maximum levels of each basis, no one definition will be taken here. The analysis will instead work within different definitions to distil relevant insights into the needs and opportunities for financing for agribusiness SMEs in Africa.

35. Stork & Esselaar (2006) differentiate between informal and formal small businesses according to: number of employees, with 10 being the threshold; lack of record-keeping; little or no distinction between business and personal finances; lack of payment of taxes; lack of registration with authorities; lack of physical address.

The majority of financing for agribusiness in Africa, however, is in the form of *debt financing*, typically from banks and other financial institutions, although financing through other value chain actors is also common for agribusiness (see below). Asset-based financing (factoring, inventory financing, export finance and leasing) is also relevant to varying degrees.

Value chain finance refers to flows of credit or other financial services through the actors along the chain, usually in order to increase the investment returns, growth and competitiveness of the chain. Examples of the within-chain financing are supplier credit and advance payments from customers; without-chain financing can come from formal or informal financial institutions. There are three main categories of value chain finance:

1. Provision of credit, savings, guarantees or insurance to or among value chain actors.
2. Strategic alliances through financing extended by a combination of value chain actors and financial institutions.
3. Tools/services to manage price, production or marketing risks.

Source: World Bank (2007a); Fries & Akin (2004)

Much attention has been paid in recent years to the expansion of microfinance in Africa to the extent that the special development and financing needs of poor individuals and even micro-sized firms are being addressed. At the other end of the spectrum, large enterprises have much greater opportunities to access finance due to their size and perceived lower levels of risk. The term 'missing middle' is used to describe the landscape in between, as medium-sized enterprises are too large to qualify for microfinance and too small to command the resources and credibility of large firms in the process of obtaining finance. There is now growing awareness that financing these enterprises, so-called 'mesofinance', is of crucial importance in ensuring that productive investment is made on a sustainable basis. Mesofinance is designed to fill this missing middle, as there is not only a dearth of willing providers of debt capital through lending, but also other providers of equity finance such as venture capital or private equity. Mesofinancing can be loosely defined as the funding of SMEs, starting where microfinance ends. It encompasses access to loans, leasing, trade credit and other forms of finance, which support the growth of businesses, particularly for capital outlays and set-up or expansion costs.

Where finance is available, it is often restricted to short-term, working capital. Financing for capital investment is usually very difficult to obtain, as such investment involves a large cash outlay and a long payback period. One of the main obstacles in this regard is the availability of collateral and high collateral requirements. Cashflow-based financing (lending against less than 100 per cent collateral) is virtually absent in African agribusiness, and the inability to use available assets (including land) as collateral gives rise to wealth rationing (lack of asset ownership of agribusiness to serve as collateral) and risk rationing (agribusiness entrepreneurs are reluctant to put assets vital to livelihoods at risk as collateral) (World Bank 2007a).

This leaves small agribusinesses reliant on family and friends to start up, and on retained earnings to grow, implying a much slower rate of growth, severely limiting access to new technologies and market opportunities, and leaves the business

vulnerable to shocks. Long-term capital investment is the priority if agribusiness is to grow and become competitive. Mechanisms to facilitate such investments are examined in Section 7.4.

7.3. Financing at the macro level: aggregate flows

Despite a proliferation of institutions providing financing to agribusiness through a variety of instruments, the needs for African development are not being met. Of the estimated \$940 billion (in 2009 US dollars (UNIDO *et al.* 2010)) needed for investment in African agriculture by 2050, over two thirds are required for agro-processing, just to meet current food needs. Investment requirements in cold and dry storage amount to \$78 billion, in rural and wholesale market facilities \$159 billion, in first-stage processing \$207 billion, in mechanization \$59 billion, and in other equipment and power sources \$115 billion (*ibid.*). This dwarfs the volume of current flows, from both the public and private sectors³⁶.

The major players in the public investment field are governments, multilateral and bilateral organizations, foundations, and development finance institutions (DFIs). The major private sector players are commercial banks, investment, loan guarantee and private equity funds, who invest through debt, equity or blended financial instruments.

Public Sources

In the past, public sources of financing have been the largest: African governments are committed to allocating at least ten per cent annually of budgetary resources for agricultural investment under the Maputo Declaration (African Union 2003), in line with that of India and China during the green revolution (World Bank 2007a). This was a landmark decision, as public investment in the sector had fallen over the previous two decades, despite agriculture's contribution of 30 to 40 per cent to GDP (Somma 2008).

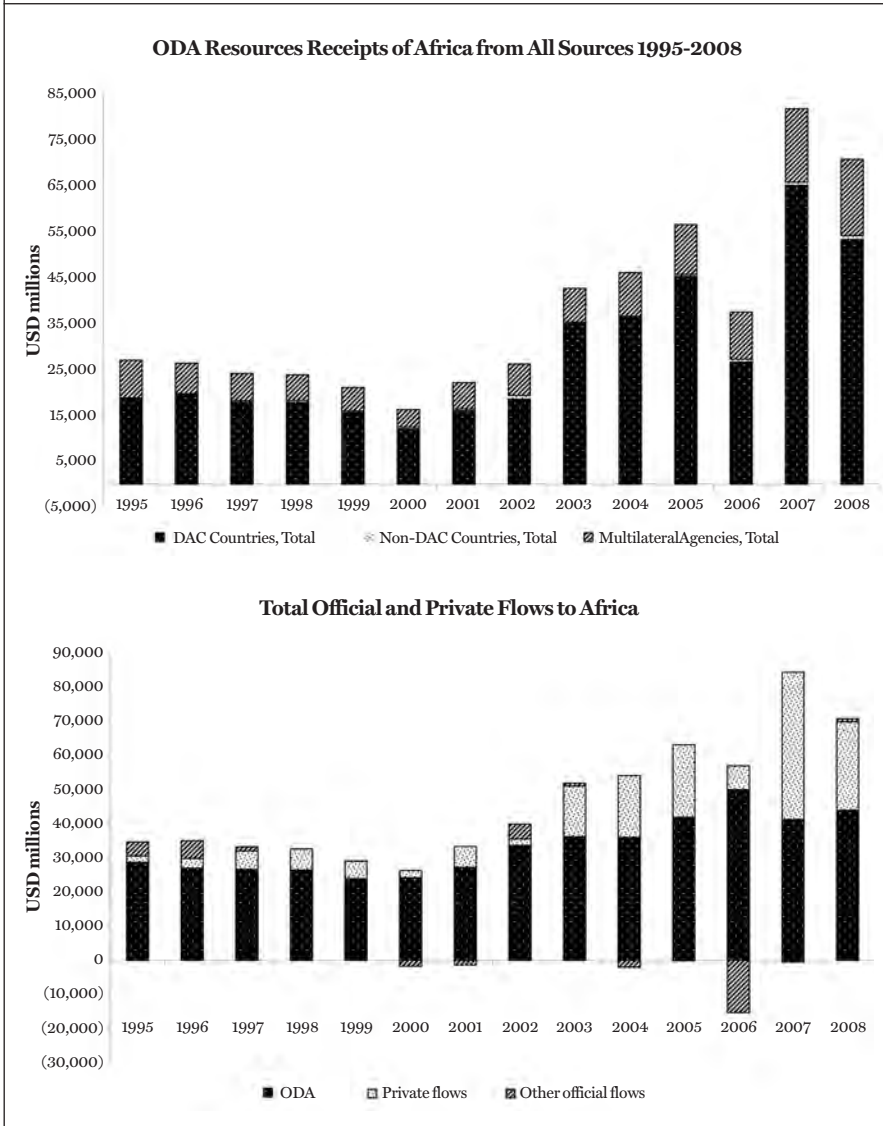
However, this target still remains to be met by many African countries, as only ten countries had reached it by April 2010 (CAADP 2010) reflecting capacity limitations in government structures, particularly at the local levels. Such constraints often reduce their ability to implement programmes, coordinate across sectors and effectively oversee national and donor funded projects. Furthermore, highly skilled staff often moves from the public sector to private sector positions or donor projects, causing a continuous need for capacity-building.

Part of the problem for domestic resource mobilization, demonstrated by low gross domestic savings rates (GDS) for Africa, is that changes in savings rates are largely driven by changes in public sector savings (Aryeetey 2004). Throughout the 1980s and 1990s, negative trends in public sector savings (through government budget deficits) kept savings rates very low, putting an extra investment burden on private savings. However, it is also important to focus on the type of investments

36. It is often difficult to disaggregate figures for agribusiness and agro-industry from those given for the categories of agriculture and industry. This is due to the fact that definitions and reporting lines are not consistent across data sources. Where disaggregated figures are available, they are used in this analysis; however flows to agriculture and industry (especially manufacturing) often include portions of agribusiness flows, and so where relevant, such figures are also presented.

made under the heading of ‘agricultural spending’. Investment that will yield long-term returns are most sorely needed to improve supply capacity, reduce post-harvest losses, and enhance infrastructure and agro-industry facilities, as opposed to short-term growth impacts such as fertilizer subsidies (Somma 2008). Many such investments into public goods have shown high returns, and make for more efficient spending (World Bank 2007a).

Figure 7.1: Total resource receipts of Africa from all sources, 1995-2007



Note: ODA resource receipts (left-hand graph) plus other official & private resource receipts (right hand graph) sum to 100% for each year.

Source: UNIDO, based on OECD (2010c)

African countries rely heavily on external public finance for agribusiness and other, development investment, benefiting little relative to other developing regions from the increase in private foreign investment (Figure 7.1). External resources such as official development assistance (ODA) are substantial and flows rose significantly, from \$10.2 billion to \$27.3 billion between 2001 and 2008 (OECD 2010b). ODA remains the largest source of external finance in sub-Saharan Africa excluding South Africa, at 8.2 per cent of GDP, compared to just 1 per cent for other all developing regions (Ratha *et al.* 2008, p.7).

While it is important to avoid relying too much on external resources for financing development, as it leaves countries vulnerable to external shocks and volatility, there is a need to define the role that development assistance should play in financing agribusiness development in Africa. Given the large volume of investment required, it is especially important to define how public and private sources of finance can best complement each other to make a lasting impact. Therefore, the volume of assistance, as well as the sectors and subsectors targeted, are crucial.

New modalities of development assistance have emerged over the past decade, with a move away from assistance to specific projects, and towards programme-based approaches (PBAs). This follows the Paris Declaration on aid effectiveness of 2005 and the Accra Agenda for Action of 2008, as these approaches provide mechanisms for coordination and pooling of donor resources, and are consistent with the focus on MDGs and Poverty Reduction Strategy Papers (PRSP). However the new modalities are focused mainly on social development (health, and education) with little impact on agriculture and agribusiness. The food crisis in 2007/8 highlighted attention on agricultural development with donors promising to increase assistance to agriculture to \$8.9 billion per annum under CAADP. Despite this, funding for agribusiness and agro-industry development continues to constitute only a small proportion of ODA, falling far short of the 10 per cent commitment towards which African governments are moving for their own resource allocation (World Bank 2007a).

In 2008, only 4.1 per cent of ODA was directed to the sector, as compared to a quarter in the 1980s (OECD 2010b; Somma 2008). Likewise multilateral institutions have tended to allocate a small proportion of overall funding to agribusiness. AfDB's lending portfolio includes only 2.9 per cent for agriculture, while the International Finance Corporation (IFC) invests just over 5 per cent of its total sub-Saharan investment in agribusiness (AfDB 2010). The World Bank (IDA and IBRD)³⁷ has a substantially greater share, with 15 per cent of lending in fiscal year 2009 going to the sector (World Bank 2009c).

Funding is in part discouraged by perceptions of high failure rates, as well as the inherent risks and transaction costs involved in agricultural development. The less than stellar performance of PBAs, such as sector wide approaches (SWAs) and sector investment programmes (SIPs) for agriculture, has been attributed in part to particular aspects of the sector. Many analysts note that the state plays a smaller role

37. The World Bank is one of the United Nations special agencies. It is also the name that has come to be used for the International Development Association (IDA) and the International Bank for Reconstruction and Development, both of which provide low-interest loans and grants to developing countries.

in the sector than in the social sectors with less control over outcomes. Other aspects, such as the requirement for agricultural ministries to work with other ministries, have hampered the application of PBAs in agriculture. Nonetheless such approaches are seen by many recipients as preferable, as they provide a harmonized approach for dealing with donors, and have the potential of strengthening country systems, and enhancing budget planning and expenditure management (Odhiambo 2007).

Multilateral institutions are also revising targets for assistance to the agribusiness sector. The AfDB's Agriculture Sector Strategy 2010-14 seeks to increase financing for the sector, with an indicative pipeline of projects and programmes amounting to \$5.33 billion for the period (AfDB 2010). The World Bank Group is to expand agriculture and related sector financing globally by between 50 and 100 per cent, which for Africa will mean an increase from \$1.3 billion to between \$1.9 and \$2.5 billion. The IFC, as the private sector lending arm of the World Bank, aims to increase its investment in agribusiness in SSA to \$100 million by the end of 2010, compared to an average of \$18 million annually over the last decade (IFC 2009).

In terms of sectors, aid has traditionally focused on short-term solutions rather than productivity and capacity enhancing investments. The post-harvest stage and beyond has not received any significant volume (Figure 7.2 and Figure 7.3). The focus of the CAADP and funding under this framework is also heavily on agricultural production, which influences donors' strategies. For example, the World Bank's Agriculture Action Plan 2010-12 for sub-Saharan Africa, organized around the CAADP pillars, is focused on increasing productivity in agriculture (especially for smallholder farmers), with 74 per cent of undisbursed balances going towards this (World Bank 2009c). However, the Agriculture Sector Strategy of the AfDB for 2010-14 targets the development of agricultural infrastructure and support for natural resource management, in line with a strategic review to reposition financing around areas of comparative advantage (AfDB 2010), and the AfDB has had some notable successes in financing for large-scale agro-industrial infrastructure Projects (Box 7.2).

Box 7.2: Markala sugar project

The Agriculture and Agro-Industry Department of the African Development Bank currently manages a portfolio of about 250 operations with ongoing commitments upwards of \$3 billion in 30 African countries (as of 2009). The Private Sector lending window of the Bank also supports the agro-industrial sector in Africa through different financial products. To address changes at the institutional, regional member countries and continental levels the Bank has revised its agriculture operations strategy, which seeks to transform the agriculture sector from subsistence to market-oriented agriculture. The Bank's operations in the sector have been financed both by concessional and non-concessional lending, as well as leverage resources from the private sector through co-financing arrangements. The Markala sugar project in Mali is a good example. For this project, concessional resources of the Bank together with other partners will be used to finance infrastructure for irrigation and the cultivation of sugar cane (concessional loan of around \$30 million), while the production of the sugar, electricity and biofuel will be financed by the private sector (loan of \$25

million). This project involves establishing a 14,132 ha irrigated cane estate in Markala, 275 km northeast of Bamako (Mali). The project will have a sugar mill with a cane crushing capacity of 8,000 tons per day, producing 190,000 tons of sugar per annum. It will further produce 15 million litres of ethanol per annum and cogenerate 30 MW of electricity. The key project sponsor is the South African company Illovo Sugar.

World Bank and AfDB spending programmes target economic and social development projects, with policy-based lending providing direct budget support to governments to foster the creation of an enabling environment for private sector operations, through policy and institutional reforms. Private sector lending windows also provide support with the AfDB's private sector window providing loans and grants, in addition to equity participation and guarantees. The IFC provides a similar range of instruments but does not lend directly to small businesses: its clients are usually near the top tier in their home markets. However, finance for smaller agribusinesses is facilitated by both institutions through support to banks and other financial intermediaries for on-lending.

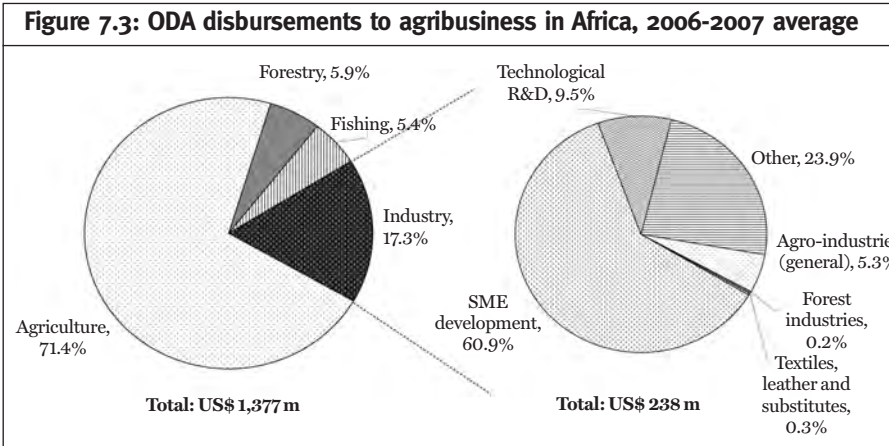
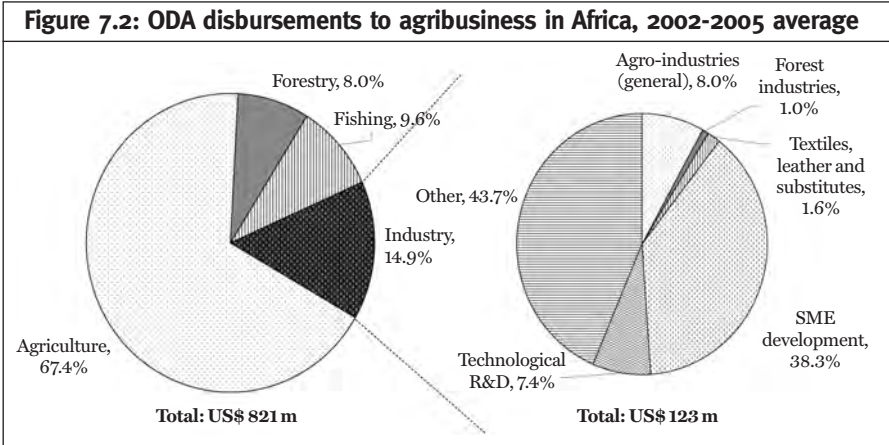
Private Sources

Private sources of financing for agribusiness can be both external (through trade or capital flows) and internal (domestic savings and investments), allocated by the financial system, mainly commercial banks. Although private sector investment in Africa has surged over the last decade, there is a paucity of data on private agribusiness investment, particularly from domestic investors.

External private sources of financing

Hard currency is required to finance imports of capital goods for African agribusiness and exports are the primary means of earning this. A significant number of African countries, however, face current account deficits, and generating export revenues as a source of finance for agribusiness development is a medium-term task (chapter 5). Shifting trade patterns for Africa, especially increasing South-South trade, are mirrored in shifting patterns of private capital flows, as other developing regions are gaining an increasing share of investment on the continent (UNCTAD 2009b).

Foreign direct investment (FDI) is chief among the sources of private financing for agribusiness in Africa and it is generally regarded as a useful source of investment, both because it is 'sticky', i.e. longer-term than other investments, but also because it brings with it management skills, market linkages and technological spillovers (UNIDO 2007). This last point is especially relevant, as other forms of technology acquisition through commercial channels would need at the outset a significant technology base and absorptive capacity (*ibid*), which is often lacking. For such spillovers to be effective, they must be absorbable by the local economy. For instance, learning effects can occur through backward linkages to local suppliers, but transfers are not automatic and mechanisms should be considered to exploit potential gains. An example is Vendor Development Schemes in Zambia, designed to foster domestic industrial clusters and link these to foreign investors.



Source: UNIDO, based on OECD (2010c)

Africa has historically attracted a very low share of FDI in developing countries, but this has recently increased to 5.2 per cent (UNCTAD 2009c), and the total flows to SSA rose to \$32 billion in 2009 (World Bank 2010a). Although information on the agribusiness share is sparse, available data point towards small but increasing flows. Business Map Foundation data (1994 to 2006) show that FDI in agribusiness in Africa was approximately one tenth of that in oil and gas (Mhlanga 2010). The share of investment in agro-industry increased during the 2000-2006 period, with food, beverages and tobacco the main sector of interest (6.5 per cent) (UNCTAD 2009c).

The Foreign Investor Survey by UNIDO (2007) shows the largest concentration of foreign investors surveyed was in food producers and processors (33 per cent), with textiles (19 per cent) and forestry and paper (14 per cent) in second place. Of those invested in food processing, the majority produced for the export market (60 per cent). Most investments were wholly owned by foreign investors (65 per cent), with 28 per cent being joint ventures. In terms of size, the majority of invest-

ments were less than \$2 million. UNCTAD (2009 – WIR 2009) highlights that FDI is more important in export-oriented cash crops and non-traditional products, such as cut flowers, rather than food staples such as cereals. This would indicate that a policy to attract FDI should include a strong focus on infrastructure to respond to export needs, including quality and standards testing and certification.

While South-South FDI is increasing in Africa, and for some countries is very significant, developed countries continue to account for the lion's share of FDI (UNCTAD 2009c). Also, most foreign investment in agribusiness emanates from the UK, US or South Africa (UNIDO 2007). Growing FDI from developing regions is mostly by multinationals from Asia and from within Africa, especially South Africa, which is one of the top investors in Botswana, Malawi and the United Republic of Tanzania, while Mauritius has 21 per cent share of the FDI stock in Madagascar (UNCTAD 2009c). The diversification of FDI sources is important, since enterprises from emerging markets provide more technologically appropriate investments for sub-Saharan countries (UNIDO 2007).

Box 7.3: Foreign investment into African agricultural production

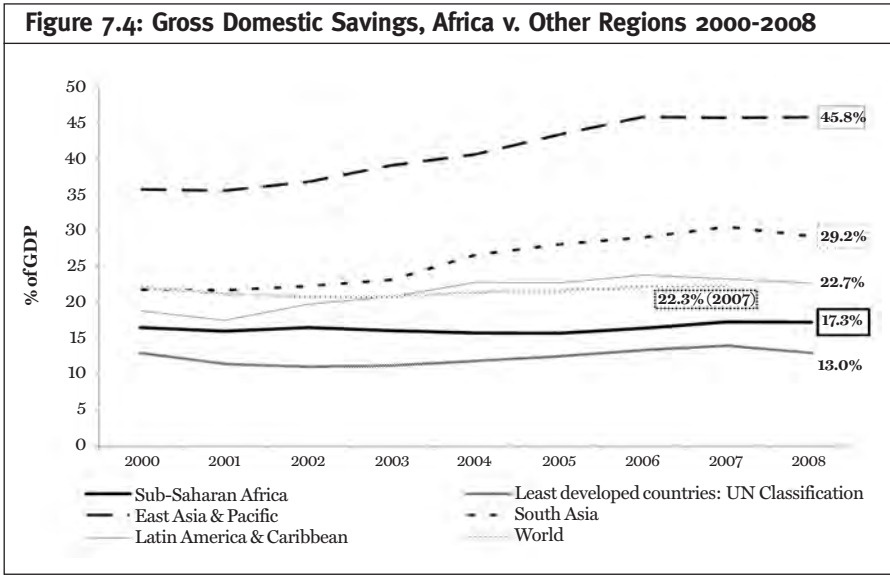
While the trend for resource-seeking FDI into Africa for oil and mineral resources has become an established feature over the last decade, foreign investments into agricultural production, especially land acquisitions, have seen a marked rise. This has provoked tense debate over the nature of such investments and the development impacts they have in particular regarding food security for the continent. These investors range from transnational corporations (TNCs), as well as 'new investors' such as state-owned enterprises, sovereign wealth funds, and international institutions. The attractions for investors are obvious: many African countries offer a plentiful supply of low-cost arable land³⁸, a good climate for growing a range of crops, fertile soils and abundance of low-cost labour. Other drivers have been the increase in demand and imports of food crops in investor countries, prompted by changing consumer trends and population growth (Brazil, India) or by resource constraints (Republic of Korea, Gulf Cooperation Council countries); biofuel initiatives and the rapid rise in food prices. Most inward FDI is focused on staple food and cash crops (including biofuels and floriculture), and for some African countries, the share of FDI in agriculture in total flows is considerable, depending on factors, such as availability of land, but also policies for promotion of investment in agriculture. Despite controversies, such agreements present an opportunity for African countries to make the most of their natural resource endowments, and offer opportunities for job creation, technology transfer and revenue generation (Section 7.4 and Box 3.1).

Source: UNCTAD (2009b); Cotula *et al.* (2009)

Portfolio investment is dominated by South Africa (over 87 per cent share), but flows to 'frontier markets' are also rising as a percentage of GDP³⁹ (Wakeman-Linn 2008), due in part to improved macroeconomic performance, political reforms and political stability, the positive real interest rate differential with other regions, and

38. It is important to note the discrepancy between official statistics on land availability and the reality on the ground, of existing land use by rural populations that may not be formally recognized. Cotula *et al.* (2009) warn that the perception that land is abundant in certain areas should be treated with caution.

39. For example, both Ghana and Kenya received average flows of 1.5 per cent of GDP from 2000 to 2007, compared to a regional average of 0.2 per cent (Wakeman-Linn 2008).



Source: UNIDO, based on World Bank (2010a)

to some extent the perception that Africa’s performance as a region is decoupled from that of other emerging markets. Capital flight has fallen in line with the positive macroeconomic developments. The improved investment climate has seen an upsurge in the number of private funds active in Africa, including commercial investment, private equity and loan guarantee funds, many of which exclusively target agro-related sectors (FAO 2010b). Investment has been further spurred by firmer global commodity prices and rising demand for agro-related products, including food and biofuels. Socially-responsible investment funds that follow a ‘patient capital’ or triple bottom line approach⁴⁰ (such as AgInvest, Root Capital, GroFin etc.) are also gaining prominence. The funds identified in FAO’s study (2010) are targeting investments across most of sub-Saharan Africa, with an emphasis on East and Southern Africa. Raising capital is ongoing for many recently established funds, and so the volume of available financing is difficult to ascertain precisely. What is more clearly discernible is the recent upward trend in setting up new funds focused on African agriculture, and investment appetite for the sector is growing.

Similarly, the growth in Africa’s banking sector in recent years has led to a surge in interest from overseas investors, with the notable \$5.5 billion investment by Industrial and Commercial Bank of China (ICBC) into the continent’s largest bank, Standard Bank, in 2007. Since then, foreign banks and large African banks, such as Ecobank, have been expanding their operations, pointing to great potential for the African banking sector to mature. The focus of many overseas banks and their respective clients in Europe, America and increasingly China and India on infrastructure, provides an opportunity to address the constraints facing agribusiness

40. The triple bottom line refers to an expanded spectrum of criteria for measuring organizational performance, in terms of economic, social and ecological impact; it is also known as ‘people, planet, profit’ approach.

development in this regard; and the general development of the banking sector bodes well for banks to broaden their portfolios to exploit the abundant opportunities in agribusiness.

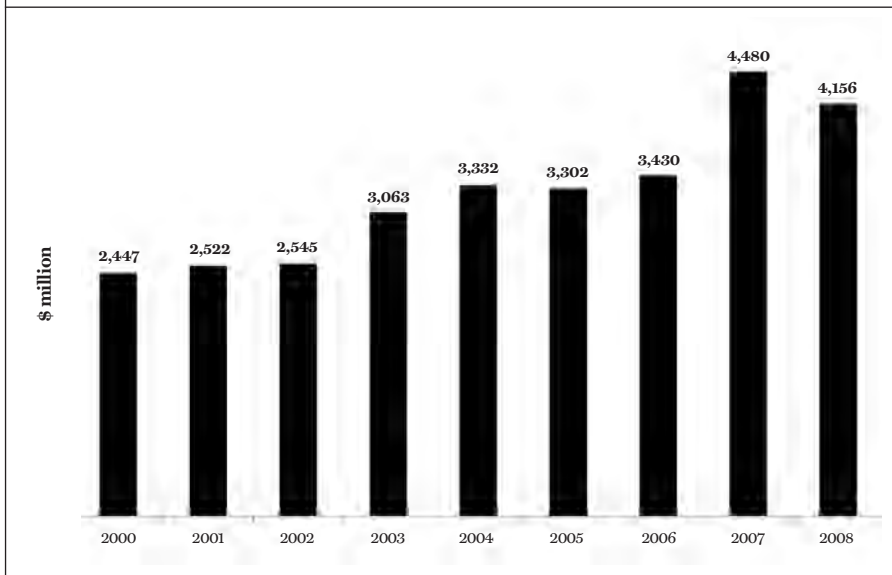
Domestic private sources of financing

Turning to internal private sources for agribusiness investment, it was noted earlier that domestic resource mobilization on the continent has been challenging. The continent continues to have the lowest savings rate of all developing regions (Figure 7.4), at just 17.3 per cent of GDP in 2008—this compares to 29 per cent for South Asia, and almost 46 per cent for East Asia. African countries that achieved high savings rates did so largely as a result of booming commodity prices, principally oil.

Domestic investment potential in Africa is largely untapped. It is estimated that about 80 per cent of all household assets in rural Africa are held in non-financial forms, whether as livestock, stockpiled goods, grain, jewellery or construction material (E Aryeetey 2010). Ways to tap into this potential to finance agribusiness investment are outlined in section 7.4.

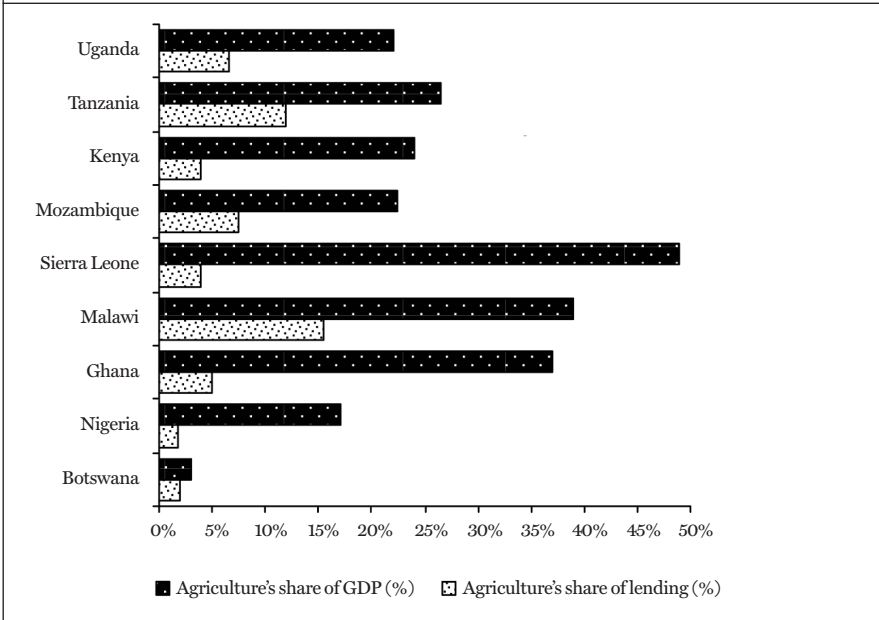
Despite the constraints arising from limited domestic savings, most financial systems of African countries have in recent years experienced excess liquidity, i.e. banks holding more cash than is necessary under normal statutory requirements. This is mainly due to large capital inflows, including resource receipts and aid (Saxe-gaard 2006), but also a reflection of the high risks involved in making uncollateralized loans and, in several instances, weak credit demand from borrowers deemed to be 'bankable'. Although banks are liquid, commercial lending to agriculture and

Figure 7.5: Value of commercial banks' lending to the agricultural sector in selected African countries



Source: UNIDO, based on data from Mhlanga (2010)

Figure 7.6: Share of commercial banks' lending to agriculture relative to total lending and to GDP



Source: UNIDO, based on data from Mhlanga (2010)

agribusiness has remained extremely low compared to the sector’s contribution to GDP (Figure 7.5 and Figure 7.6). From FAO surveys of lending to agriculture in selected African countries (FAO 2010c), it emerged that commercial banks lend less than 10 per cent of their loan portfolios to agriculture, with few exceptions.

In a growing number of countries the problem is being overcome by indirect financing, especially by merchants who borrow from banks and then on-lend to smallholders on a contract farming basis. This is a growing trend in East and Southern Africa, especially for export crops like tobacco and cotton.

Structural factors underlie this situation of low credit provision to agribusiness and agro-industries by commercial banks. Firstly, the extent of lending depends on the degree of commercialization of agriculture, as distinct from subsistence, which greatly impacts on the risk of borrowers. This also links to the issue of end markets, and whether production is for export or domestic consumption. Linkages with TNCs through contract schemes provide much greater access to finance for small-scale producers, although mostly for export-oriented products—for example, in Kenya 60 per cent of tea and sugar is produced under contract farming arrangements (UNCTAD 2009b). Secondly, limitations in bank lending are most acute for term financing (five to ten year duration), as banks themselves have difficulties accessing funding for longer periods. Finally, prevailing land tenure systems hinder bank lending to agriculture. Persistent insecurity over property rights precludes the use of available assets as collateral for obtaining credit. Land rights can only be accepted as collateral if they are well defined, transferable and legally enforceable,

which is not the case given the situation of legal pluralism over tenure. Ways to address the situation of insecure tenure and property rights, with a view to expanding opportunities for credit, are examined below.

Although there has been an increase in the amount of external and internal public and private sources of financing for agribusiness investment in Africa in recent years, the flow of funds falls far short of what is required. Public sources—government spending, public savings, ODA, and other external public flows—have had a limited impact on the flow of funds to the sector. Domestic resources fall short of governments' commitments, and while ODA has risen, it remains a small percentage of overall aid, focused on short-term solutions rather than productivity and capacity enhancing investments. The large multilaterals have set modest targets for increased lending, but it is set to remain a small proportion of their portfolios. Meanwhile, private sources—trade revenues, FDI, portfolio investment, and internal financial savings and credit—have become more dynamic and diversified. As the overall economic environment has improved, and higher commodity prices have enhanced the attractiveness of agribusiness as a sector, trade revenues and foreign investment have accelerated, with the strongest growth from other developing regions, and while internal financing savings rates remain low, bank lending to agribusiness has been on the rise.

7.4. Framework for facilitating financing

In the light of the above, what is needed to improve access to finance for agribusinesses on the continent? The key to unleashing resources from the private and financial sectors is to increase profitability and reduce risk. Innovative mechanisms seek to achieve this through providing collateral, spreading risk among investors and leveraging the access to finance by one party to the benefit of other lower-rated parties, for example through guarantees (Ketkar & Ratha 2009). At the micro level, reducing the inherent risks of financing agribusiness must be a priority, as well as facilitating innovative products and encouraging a range of finance providers to make the much-needed investments into the sector. At a macro level, it is clear that the current sources and indeed standard models of financing are insufficient to provide the necessary resources for financing agribusiness and agro-industrial development. Hence it is essential to identify sources of additional financing, while also boosting capacities to mobilize further resources from traditional sources.

A comprehensive overhaul of finance for agribusiness requires a framework that coordinates and concentrates efforts of public and private sector actors along the value chain to ensure impact. The establishment of national (and possibly regional) umbrella funds for channelling resources to agribusiness development provides such a framework. Public-private partnerships could make a major contribution, while public sector interventions designed to reduce risk and raise profitability are essential. The public sector provides funding for infrastructure and technical assistance to build capacity (agribusiness enterprises, support institutions and government bodies), whilst the private sector would be able to access refinancing and guarantee facilities for agribusiness loans and investment. They would also receive capacity building through training to build outreach and expertise in agribusiness. This frame-

work and its components can be tailored to national (or regional) contexts, including the appropriate resource mobilization strategies (elaborated below), and cooperation and information-sharing mechanism between the public and private sides, important for promulgating portfolios of bankable investment projects. Moreover, funds can be structured in such a way that different investors with different return expectations are represented through different instruments. For example, an international financial institution might prefer to invest equity, taking on more risk but with the possibility for the highest return; meanwhile, donor agencies may prefer a term loan with a low interest rate but lower risk, and some philanthropic investors or foundations may invest via programme-related investments, which usually carry rates of return substantially below market rates.

This concept was at the fore of discussions between African policymakers at the recent High-level Conference on the Development of Agribusiness and Agro-industries in Africa (HLCD-3A), held in Abuja in March 2010. The conference endorsed proposals to develop a financing mechanism to implement the African Agribusiness and Agro-industries Development Initiative (3ADI). The mechanism will aim to substantially increase investment in these sectors. In addition to the establishment of umbrella funds to channel resources, the framework will of necessity include strategies for mobilizing resources on a large scale, and measures to reduce risk and raise profitability through improvements in financial infrastructure, innovative financing tools and models, and capacity building and technical assistance.

Large-scale resource mobilization

Domestic resource mobilization

Using national savings for productive investments enhances growth. However, the ability to mobilize domestic savings for investment depends very much on the market structures of African economies. For this to happen on a large scale in Africa, the financing of household assets needs to increase, which can be aided by financial sector reforms. Aryeetey (2004) describes the vicious circle facing African economies, as structural change is necessary to generate savings, while savings are required to propel structural change. Building on the microfinance trend in Africa, this can be scaled up and expanded to include demand-driven savings products for households. Any such approach will need to address the issue of the large liquidity premium sought by those engaged in agro-related economic activities (most of the population), due to the seasonality of their activities and income, by reducing risks associated with agribusiness activities.

A second area of consideration is maintaining macroeconomic stability to ensure that returns on financial assets are more stable and predictable. Thirdly, institutions with better outreach to rural asset holders, such as microfinance institutions (MFIs) reduce the transaction costs for them of holding their assets in financial form (*ibid*). Domestic resource mobilization holds huge potential for productive investment into agribusiness, but it is a long-term solution, and correspondingly, a long-term endeavour that cannot meet immediate needs for increased financing.

Leveraging diasporas

The African diaspora consists of approximately 30 million people living outside their country of origin, and it is estimated that they jointly contribute \$40 billion in remittances, far exceeding ODA (IFAD 2009). The International Fund for Agricultural Development (IFAD) survey results show that at least 10 to 20 per cent of these remittances are saved or invested. According to an AfDB (2009) study of four African countries, over 70 per cent of investment projects supported by migrants are in agriculture. The proportion of remittances sent for consumption support to family or other beneficiary households varies with the skill and qualification levels of migrants, with those in higher socio-professional categories allocating most of their remittances to longer-term investment (ibid). This study found that the low share of remittances set aside for investment is due to two main factors: (a) beneficiaries' limited capacity to set up and manage productive activities, and (b) migrants' lack of confidence in intermediary structures. It is important to put in place strategies for improving remittance systems, such as reducing costs and the outreach of money transfer operators.

Remittance flows can also be used to raise financing for agribusiness development through securitization, i.e. pledging future flows of remittances as collateral to investors on international capital markets. The African Export-Import Bank has been active since the early 1990s in arranging future flow securitization, such as a \$50 million remittance-backed syndicated note issuance facility for a Nigerian entity using MoneyGram receivables in 2001. Issuance of diaspora bonds provides an opportunity for leveraging the savings of diasporas, as well as remittances, for productive investment in countries of origin. India has raised \$11 billion from its diaspora abroad in this way (Ketkar & Ratha 2009). Diasporas tend to take a different view of investing in their home countries and currencies, as they are more familiar with the risks and usually already have currency exposure. Such bonds are also usually marketed as patriotic and build on the will to support development in the home country. Governments could issue such bonds earmarked for investment in agribusiness.

Both options—securitizing remittance flows from the diaspora, and targeting the diaspora as investors—are complicated and not likely to be available to all countries in sub-Saharan Africa, but it holds promise for financing agribusiness development for countries with large diasporas, such as Nigeria, Sudan and Uganda (Honohan & Beck 2007). They present potential for leveraging large resources—some estimates suggest that the first option could amount to \$17 billion, and the second up to \$10 billion, of financing for sub-Saharan Africa (Ratha *et al.* 2008). Issues to consider for both options are the strength and transparency of legal systems to ensure contract enforcement, the cost of legal and advisory services, and building relationships with foreign banks and financial institutions to ensure bonds are effectively marketed to the relevant target investor cohorts.

A similar approach is possible with other flows of money for securitization, such as natural resource receipts, or aid flows. The potential to raise large scale resources from these methods has been developed in the health sector, such as the Interna-

41. Comoros, Mali, Morocco, and Senegal.

tional Finance Facility for Immunizations (IFFIm). IFFIm converts long-term government pledges into immediately available cash resources, by raising funds through issuing bonds in international capital markets, relying on the legally binding agreements with highly creditworthy donor countries. This is particularly important for investment into agribusiness infrastructure, science and technology, as these public goods are more difficult to attract private investment (OECD 2010d).

Sovereign Wealth Funds

Sovereign Wealth Funds (SWFs) are investment vehicles whose funding is derived from money set aside from central bank reserves that accumulate from budget and trade surpluses, and thus are often used by resource-rich countries that mobilize substantial revenue through exports of minerals and oil. At present, many African countries are effectively consuming their capital because as oil and mineral resources are depleted over time, the proceeds are spent on current consumption, rather than on long-term investment.

With the resurgence of resource nationalism, governments are stepping up the mobilization of such revenues, although to date only a few African countries have shown evidence of ploughing these back into investment in physical and human capital. Nigeria is a good example of this, where windfalls from oil export revenues are being used to stimulate agribusiness and SME lending through the banking system. Developing sustainable and credible mechanisms to overcome the potential 'resource curse' should be a priority in resource-rich economies, many of which are victims of Dutch disease effects, that turn the terms of trade against agricultural production and the agribusiness sector. Resource wealth can then provide a substantial source of revenues for investment into agribusiness and agro-industries, creating more labour-intensive economic activities, thereby contributing to more stable and sustainable development and broad-based wealth creation. Well-managed SWFs could be used to enhance the efficiency and equity of development programmes with a particular focus on agribusiness.

Targeting FDI to the agribusiness sector

Analysis provided earlier showed that FDI to the productive sector, particularly agribusiness and agro-industries, is very limited. Targeting FDI to these sectors can play a critical developmental role in terms of creating competitive export-oriented industrialization, as evidenced in East and South-East Asia. The establishment of an investment-friendly environment and business climate for the attraction of domestic and foreign investment in manufacturing is an important priority. More generally it is also critical to enhance spillovers from FDI on the development of domestic capabilities, which calls for the creation of an appropriate science and technology base.

The controversies over TNCs and FDI into agricultural production discussed in Box 7.3 highlight the need for African governments to ensure that policies are designed to maximize benefits from such investment and participation in their agribusiness sectors. This extends to being canny negotiators in the terms and conditions of deals, and seeking to ensure that potential negative impacts are duly

considered. The greatest benefits that countries can derive from these investments are not in the form of fees for leasing the land; focus should instead be on investors' commitments to certain levels of investment and employment creation, and infrastructure development. Policymakers should further distinguish between FDI and non-equity participation in agribusiness value chains, as there are different impacts. For example the capital intensity involved in biofuel production is more likely to favour FDI, than labour-intensive production which favours contractual arrangements with producers. Therefore when strategizing for attracting FDI for agribusiness, policymakers should also consider the linkages of domestic producers with transnational corporations through other contractual arrangements.

Box 7.4: Negotiating contracts for agribusiness development

The following areas are relevant for consideration in negotiating investment contracts between host countries and foreign investors, including the possibility for setting conditions and minimum/maximum thresholds to be met, timelines, incentives and penalties etc.:

- Entry regulations for TNCs
- Creation of employment
- Technology transfer and research and development
- Welfare of local population
- Production sharing
- Revenue distribution
- Local procurement of inputs (including labour)
- Requirements of target markets
- Development of related infrastructure
- Environmental protection

Source: UNCTAD (2009b)

Project finance for agribusiness and agro-industrial infrastructure

Chapter 9 clearly illustrates the vast investment needs in terms of infrastructure and energy for sustainable agribusiness development on the continent, and discussed the financing constraints faced by large-scale projects. Despite challenges, there are significant opportunities for attracting and leveraging investment, for instance emerging forms of project financing including carbon finance (suitable especially for the energy sector), climate change adaptation funds, microcredit facilities, public-private partnerships ventures and bilateral project investments. A recent example is China's growing participation in sub-Saharan African infrastructure investment, especially projects related to natural resources.

The type of energy services and infrastructure required and the scale of demand will determine the most appropriate form of financing. Traditional forms of finance for large-scale projects include public finance (international or national), private-public partnerships, concessional and non-concessional loans. Public-private ventures are increasingly being seen as vehicles of financing energy production initiatives, and should thus be considered where applicable. In addition, financing suitability of projects is boosted when the energy project is aimed at productive uses that generate incomes, as is the case of agro-industrial processes.

Carbon finance is an emerging source of financing that is gaining recognition in developing countries. The Clean Development Mechanism (CDM) is one of three ways under the Kyoto Protocol in which developed countries can reduce their greenhouse gas emissions (GHG)⁴². Under this arrangement, developed countries invest in projects implemented in developing countries which reduce GHG including energy projects. Africa is yet to tap adequately into this resource and currently holds only two per cent of the total number of projects under CDM in the world (UNFCCC 2008). Carbon finances are monetary resources generated from carbon markets. The overall goal of the carbon markets is to provide cost-effective measures to reduce greenhouse gas emissions which are the main drivers of climate change. The value of this market was estimated to be \$64 billion in 2007 (Capoor & Ambrosi 2008).

The concept of build-operate-transfer (BOT) is a form of project financing whereby a private company of investor receives a concession from the public sector to finance, design, construct, and operate a facility, such as port, power plant etc. This has played a significant role in building up infrastructure in countries such as India, China and Viet Nam, and holds promise for African agro-industrial infrastructure. Due to the long-term nature of the contract, fees are usually raised during the period of concession, and the increase in fees may be tied to a combination of variables, allowing the proponent to reach a satisfactory internal rate of return for its investment.

Private sector investors can play a significant role in availing financing and technical expertise in the energy sector. Policies that are conducive for private investments are a prerequisite to this. New ways of structuring the industry have emerged in Africa since the 1990s in a move away from the state-owned energy monopolies. Some African countries have adopted policies to unbundle and privatize their power sector to introduce the much needed competition. Private sector participation can also be through management contracts, concessions and joint private-public ventures.

Improvements in financial infrastructure

Although African financial systems have been strengthened in the last 15 years, it is clear that more work needs to be done to improve access to finance for agribusiness and agro-industry. This need was underlined at the HLCD-3A in Abuja in March 2010, leading to a declaration by the African Heads of State and Government to increase and improve access to finance for agribusiness and agro-industrial sectors. Improvements in the financial infrastructure—that is, the set of rules and institutions that enable financial intermediaries to operate effectively—are still necessary, including the expansion of collateralization; adaptations of banks' funding models and regulation; and legislative and institutional changes to allow for alternative methods of financing agribusiness, such as leasing.

Expansion of collateralization

Banks tend to rely on the Five Cs methodology to evaluate credit applications: capacity, character, capital, collateral, and conditions. In practice, collateral is typically considered a condition rather than not just an evaluation criterion (IFC 2010).

⁴² The Kyoto Protocol considers six greenhouse gases, including carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride.

However as noted earlier, most assets are not in forms that can be accepted as collateral and this is often attributable to the regulatory and administrative environment. Even where collateral is available, the cost to bank of registering it and ensuring its value can be realized, can be very high compared to the return on the loan.

The insecurity of tenure and land rights in most African economies is a key constraint. Attempts at providing greater tenure security by formalizing tenure (i.e. converting customary tenure rights into formal rights) through titling programmes and individualization of land rights have generally proven ineffective and costly. Such programmes require substantial capacity and resources to undertake surveying (recording the physical features of land parcels), adjudication of conflicting claims to title, and maintaining adequate records. Given the dearth of private institutions to carry out such functions, tenure reform processes in most African economies must out of necessity, rely on substantial state involvement, at least initially and are subject to severe resource constraints within state bureaucracies. In addition, it is difficult to accommodate the complexities of customary rights in titling programmes and earlier failures of attempts at formal titling underline the view that local landholding systems have proven more persistent, flexible and responsive than anticipated (Drimie 2000; Moyo 2000).

Experience shows that it is difficult to reconcile the social goal of improving tenure security, and the economic goal of improving security of transactions in order to enable access to credit; the former calls for harmonization of the different legal systems of formal and customary law, while the latter necessitates a further shift towards the concept of land as property and not as heritage (which is by definition, non-transferable) (Delville 1999). Finding a sensible balance between these is a complex issue, which is not feasible to address in detail here. However common sense would indicate that individualization of tenure and a formal registration system can only be a long-term goal; in the meantime step by step approaches to tenure improvements can provide stronger legal recognition of existing land rights and other assets that would increasingly enable these to meet the criteria of qualifying for use as collateral—i.e. render them well-defined, transferable and legally enforceable. Recognition of informal, innovative tenure types is important and voluntary formalization, for example to execute particular transactions, is less resource-intensive. Regardless of the approach taken, it is critical to ensure that secondary rights (often for women) and use rights (as opposed to administrative rights) are protected in any reform process. Functioning rural land markets are also a precondition for use of land as collateral, and these are often absent in African economies. Banks or other lenders are interested in recovering value through selling land, rather than farming it, in the case of default. Where sales of land are difficult and land markets illiquid, tenure reform in rural areas cannot be expected to have a significant impact on access to credit.

Enabling other assets to be used as collateral entails enforcement of property rights more broadly, and touches on the legal and judicial institutions that provide a backbone for financial systems. In general, the types of movable assets accepted as collateral are very limited⁴³, whether by law or by established lending practices.

43. IFC (2010) estimates that some 78 per cent of the assets of business enterprises in developing countries comprise mobile assets, but lending institutions are slow to accept these assets as collateral.

Tackling this requires reforming legislation on secured transactions and collateral registries. This is critical to determining the scope, priorities and enforcement mechanisms for transactions secured by moveable assets. The second aspect to consider is the capacity of banks to audit and monitor a borrowing base consisting of moveable assets and for marking these to market where necessary. Issues to address in this regard are staff training, internal policies requiring on-site visits to clients; and including the rights to conduct such supervisory visits in lending agreements (IFC 2010). Thirdly, the institutional infrastructure is very important, and includes credit information systems and collateral registries. It further requires a credible enforcement system, through an efficient judicial system, which is easy and not too costly to access, and where proceedings are of reasonable duration in proportion to the value of the transaction. The ability to realise the value of recovered assets, for example to sell repossessed inventories or machinery, is crucial, and may be available to different degrees for different types of moveable assets. Addressing each of these areas is necessary to ensure that movable assets can be used as collateral by agribusinesses. Such reforms have been successfully implemented in other developing regions (e.g. Viet Nam, Cambodia) and should take place within the context of wider reform of financial systems, which can also address for instance refinancing of agribusiness loans through a Central Bank window.

Using moveables, such as inventories, to secure finance also requires that these can be securely held and independently verified, which calls for conformity infrastructure such as metrology, testing and inspection services. Warehouse receipt schemes are one example of this. Producers are issued warehouse receipts for goods deposited (usually non-perishable commodities) in safe and secure warehouses. The deposited inventory then serves as collateral for financial institutions to extend credit for inputs or investment (Box 7.5).

Box 7.5: Case study: Zambia's warehouse receipt system and out-grower schemes

The Zambian Agricultural Commodity Agency (ZACA) initiated a programme in 2002 to facilitate farmers' access to finance. ZACA certified warehouses to issue transferable warehouse receipts as evidence that a specified commodity of stated quality and quantity has been deposited at a particular location by a named depositor, who could be a producer or cooperative, exporter or processor. These receipts were then used as collateral for short-term bank loans or sold to buyers as proxies for the underlying commodities, while a donor-funded credit guarantee agency offered to guarantee 40 per cent of the loan. Any price appreciation during storage accrued to the depositor. This programme has since evolved into the Warehouse Receipt System (WRS), a network of certified warehouses providing the service at scale. The system provides other benefits than access to finance, such as access to market information provided by ZACA, participation in modern agricultural commodity markets, reduction of post-harvest losses.

An example of out-grower schemes is the Kaleya Small Holders Company Limited (KASCOL), a scheme created in the 1990s by a consortium of Zambia Sugar, the Development Bank of Zambia, Barclays Bank and the Commonwealth Development Corporation (CDC), each with a 25 per cent share in the company. It was launched by Zambia Sugar to assure additional supplies of raw sugar for

crushing after the purchase of new equipment. The government provided the land, CDC provided initial funding, while Zambia Sugar funded the development of infrastructure. Smallholder farmers (currently 161) have seen a 50 per cent increase in the average size of their cultivation areas. KASCOL has helped farmers overcome barriers to entry on a highly competitive industry, improve their managerial skills, as well as raise their productivity through improved fertilizer methods application and greater knowledge of the importance of quality characteristics and requirements. However farmers have raised concerns, chief among which is their exclusion from price formulation and designing revenue-sharing mechanisms.

Source: OECD (2006); UNIDO interview with KASCOL

Agribusiness banking models and regulation

The tenor, or duration, of credit is of particular relevance for making capital investments in agribusinesses, such as equipment or machinery. As noted earlier, term financing (for a period of five to ten years) is the area of most difficulty for obtaining bank credit. This is partly due to the fact that African banks often face difficulties in accessing long-term funding, and thus are constrained in the extent to which they can extend longer tenor credit to borrowers. Smaller banks tend to face more acute problems in accessing long-term funding. Refinancing facilities address this mismatch in the maturities of assets and liabilities, and hence banks' constraints in accessing long-term funding. These can be facilitated by Central Banks, or development finance institutions (DFIs), and structured in parallel with other financial tools such as guarantees. A foreign currency component is usually helpful in facilitating financing for export-oriented agro-enterprises.

Furthermore, the move away from traditional regulation by banking supervisory authorities, which focused on documentation, to risk-based bank supervision and regulation is helpful for facilitating agribusiness lending by local and national banks. The traditional focus on proof of formal collateral, audited financial statements etc. means that where any of these is absent, banks must automatically provision a greater proportion of the loan, which impacts negatively on banks' profitability. For example, banks are often required to fully provision for loans that are performing, but lack proof of collateral (Honohan & Beck 2007). Under the risk-based approach, banks and lenders are regulated on the basis of their ability to manage risk, including portfolio diversification and management techniques. This is becoming the norm, but for it to be effective in Africa, it requires training and significant changes in work practices for the personnel of the relevant authorities. As international banks adopt the second phase of the Basel Accords on banking supervision (Basel II), they are likely to more stringently allocate credit and use more structured deals for financing commodity exports from Africa, in particular for smaller clients, and low or unrated agribusiness companies (UNCTAD 2007b).

It remains to be seen whether agribusinesses benefit from the increased competition in African financial systems, as some commercial banks may look towards relatively underserved market segments. For the present, there is still a clear gap, and agricultural banks and DFIs⁴⁴ have retained a role, because private sector insti-

44. Honohan & Beck (2007) tally these at approximately sixty state-owned DFIs.

tutions have not emerged to provide the same type of finance, namely term finance for industrial development and agriculture at fairly low interest rates. The advantage of remaining DFIs and agricultural banks is that they tend to have much better outreach, or 'boots on the ground', in rural areas than other financial institutions. On the other hand, there are strong views to the contrary, for example that DFIs are open to elite capture and cannot be run on a financially sustainable basis (Honohan & Beck 2007), and recommendations for reform often centre around privatization. However continued state ownership can be consistent with reforms, as in the case of BNDA Mali (Doran *et al.* 2009), and many critical elements of reform can be implemented regardless of ownership, such as an end to subsidized interest rates. This typically creates excess demand for loans and rationing of those loans then takes place by a combination of political influence and by increasing the transaction costs of applying for the loan, both of which tend to reduce rather than improve the access of small-scale enterprises to finance. Simplifying loan procedures, but maintaining close to market interest rates may thus be more effective in improving access of smaller firms to financing than subsidized interest rates. Other reforms are mobilizing savings; demand-based products; and aligning staff incentives to private sector.

Leasing

For capital investment, alternative options to bank credit are possible, such as leasing, which gives businesses the opportunity to use, and potentially own, equipment in return for a scheduled set of payments. It is a form of asset-based financing, where the seller of the fixed asset (the lessor) also provides the financing required to the buyer (the lessee). The asset itself provides collateral for the transaction, as it remains the property of the lessor for the duration of the contract, thus in case of any issue with repayment, the lessor can legally repossess assets. At the end of the lease contract the asset is often transferred to the lessee, for a final payment. It is a useful form of financing for agribusiness, as it gives access to equipment and machinery, without placing a heavy burden on cash flow, and helps conserve cash for working capital. Specialist leasing companies often work with equipment manufacturers, as their financing arm.

The IFC has a long record of providing resources for private-sector leasing. This usually requires changes in legislation, to align laws governing commercial contracts, financial regulation and tax rules. It also requires the existence of an efficient second-hand market for the equipment in question. The absence of such a market renders the underlying asset illiquid, and providing little security for the lending institution. Additionally, higher uncertainties regarding resale values and ease of disposal, will naturally lead to demands for increasingly larger down payments. Illiquid markets for agribusiness equipment and machinery in many African economies, as well as repair and maintenance services, pose challenges; however equipment pools for leasing are possible where equity capital is leveraged using export finance to create equipment pools managed by local leasing firms. This innovative approach removes the capital constraint faced by many domestic leasing programmes.

Innovative financing tools and models

Improvements in financial infrastructure are crucial, but are often long-term aspirations, depending on how quickly institutions, behaviour, and markets can be made to evolve. Innovative tools and models for financing agribusiness that have already been tested can be more likely to yield results over the short to medium term. These include risk mitigation for bank lending; other financial services including insurance; facilitating external finance through TNCs and other large value chain actors; and equity and hybrid finance.

Risk mitigation for bank lending

As noted earlier, African financial systems are in a situation of excess liquidity but this is not being directed to productive sectors that are credit-constrained like agribusiness. Methods to mitigate the risk that banks perceive in lending to the sector are crucial in leveraging these resources, and guarantee facilities are helpful in this regard, in particular for targeting SME clients. These are gaining increased traction, including from donors (USAID, AGRA/Rockefeller and Gates Foundation). The design of such schemes is crucial, and must be done through dialogue within individual financial systems, as optimum designs will vary by country and by region. Issues to consider in the design are: fee structure; portion of risk to be covered (e.g. first loss, shared loss); targeting of sectors/beneficiaries (smallholders, agro-processors etc.); portfolio mix, etc. The design should also consider the susceptibility of any guarantee scheme to moral hazard, and any initiatives already underway. It is important to design such facilities in line with an overall strategy for facilitating finance to the sector. Other illustrative components would be: including refinancing facility in order to address the funding constraints of banks in providing term finance; providing technical assistance for clients and for banks; insurance schemes alongside lending; and providing incentive structures for banks that meet targets.

Other financial services

While increased access to credit for agribusinesses is crucial, it should not be seen as a panacea in itself: other financial services are also critical, including savings and insurance. Unpredictable events such as unfavourable weather are often of the greatest concern to productivity of agribusinesses in Africa, particularly where most agricultural production continues to be rain-fed. Having savings protects businesses, especially SMEs, from some of the downside, as an alternative to selling off productive assets in times of crisis. On a macro level, it also improves the domestic resources available for investment in the sector. Insurance products allow producers and agribusiness to better optimize investment decisions and protect them from losses in the face of potentially catastrophic events, such as drought or flooding. Insurance schemes for agribusiness spread risk over time, but also over a pool of clients, and improve access to credit.

Linking to global financial markets for reinsurance is important to cover the tail end of risks. A notable innovation in this field is indexed-based weather insurance. The issues of remoteness and scale in providing efficient financial services for

agribusiness can also be addressed through improved information and communications technology. The well-known example of M-Pesa's success in Kenya, which has tapped into the person-to-person remittance market using mobile phone technology, is instructive (Box 7.6). Today, more than 7 million people have signed up and the M-Pesa model is being replicated in the United Republic of Tanzania, Ghana, and South Africa. Innovations such as these help to drive down unit costs of providing financial services to agribusiness, and tap into the unexplored potential in African economies.

Box 7.6: M-Pesa leads mobile banking revolution

M-Pesa was launched in March 2007 in Kenya, where it has reached 5 million customers. Money is transferred from one individual to another by SMS with any mobile phone that has a SIM-enabled card. Individuals can register at any agent kiosk by showing an identity card. No registration fee is required. The maximum amount transferrable is KES 30,000 (\$ 400) although most of the transfers are below KES 3000 (\$ 40).

M-Pesa has been successful because it is safe, secure and embedded in existing practices and structures. M-Pesa has adequately addressed the need for an efficient, reliable and affordable financial transfer medium among the poor, which has largely remained unmet until recently. The distribution network is based on agents who were already present in markets. Agents receive basic training from M-Pesa. Only three months after the launch of M-Pesa, the service had 400 agents, compared to 450 bank branches and 600 ATMs in Kenya. By 2009, M-Pesa had 3,400 agents. Users load money onto their mobile devices (SIM account) and can transfer amounts to other mobile phone users. The transfers are made in the form of bankable SMS. Loading and withdrawing of the cash can be done at any agent's outlet across the country. Mobile users can also use this service to pay bills.

M-Pesa has gone international and now persons in the UK can send money to mobile users in Kenya using Western Union and MoneyGram agents. This is expected to expand to other countries as well. Such innovative ICT applications open possibilities for trade and money transfer within the agro-industrial and agribusiness sector. Payment can now be made to rural or remote suppliers, who were previously cut out of the formal money transfer mediums. This also improves safety and accountability, hence easing overall business transaction process.

Source: Adapted with amendments from AfDB & OECD (2009)

External finance through large value chain actors

Large value chain actors, such as TNCs and retailers, can provide opportunities for smaller actors to access credit. Contract farming and outgrower schemes link larger agribusiness firms with farmers and other agro-producers via production and marketing contracts: processors provide a market outlet and access to credit and in return they are assured of a reliable supply of quality inputs. The extension of credit often works through warehouse receipt systems, with credit supplied for purchase of necessary inputs by upstream producers. The participation of TNCs in African agriculture has promoted modernization and commercialization of the sector through contract farming, transfer of skills and know-how and production methods, improved access to credit and inputs, and access to markets. However, in contrast to Asia, a significant number of African countries lack clear regulatory frameworks

for contract farming. Devising model contracts is a useful tool for promoting contractual linkages between TNCs and local producers. Promoting economies of scale through clustering, such as cooperatives, is also important for ensuring power asymmetries are not exploited to the detriment of smaller producers (chapter 8).

Export finance from agribusinesses' clients in developed countries can also be better leveraged to finance machinery and equipment imported from these countries; while this occurs on an ad hoc basis, a more integrated approach that addresses the value chain, and builds on existing relationships across borders is required.

Equity and hybrid finance

One option that has been relatively under-explored for financing agribusinesses in Africa is that of private equity and venture finance. Risk capital can complement the resources of banks, and as outlined earlier, there are funds already active in the sector. International private equity funds have tended to pay more attention to larger businesses in developing countries, concentrating on privatizations, corporate restructuring, and strategic alliances between multinationals and local corporations. The challenges for these in relation to agribusiness SMEs are the high transaction costs, small deal sizes, low levels of awareness and openness to private equity among agro-entrepreneurs, and paucity of opportunities for favourable exit. Nonetheless, the landscape is changing with more and new types of funds emerging that focus specifically on this segment.

Models such as 'angel investors' (usually private individuals who invest in a start-up and share personal management experience with the entrepreneur) offer potential for developing agro-industry in Africa. Hands-on involvement by 'angels' and close proximity to the entrepreneur are usually key elements, and for this reason they are usually based domestically. Given the relatively small deal size, sourcing deals can be expensive and it makes sense to link investment firms through a system of information-sharing with institutions running business incubation, extension services, or training for agro-entrepreneurs.

One of the main concerns for private equity or venture capital investors in African markets is the ability to exit from an investment, i.e. at the end of the investment period; investors realize capital gains through selling their stake in the company. This is usually through sale to strategic investor, to another financial investor, management buyout, or floating the company on a stock exchange (known as initial public offering, IPO). Underdeveloped capital markets make IPOs a difficult option in most cases, and opportunities for exiting are usually limited to selling to a strategic or another financial investor. Investors can seek partnerships with TNCs operating in the sector, which may be based either internationally or regionally.

Another option is hybrid finance. Placing greater emphasis on investor participation in revenues (rather than the conventional capital gains from exit), through shareholder loans is helpful for agro-enterprises looking to expand (Gibson 2008). In addition to taking a minority shareholding in the equity of the enterprise, an investor provides a low-interest loan with an attached right to a share of the enterprise's gross revenues for the duration of the loan. Also further agreed at the time

of investment is the price or multiple of original equity investment the entrepreneur will need to pay the investor for his equity at the exit period. The investor captures upside through the share of gross revenues generated, and the exit from equity is priced realistically for the entrepreneur (see Box 7.7 for an example). This kind of hybrid finance, a mix between private equity and cash-flow based financing, aligns investors' risk more closely to that of the business and thus their incentive to see the enterprise succeed. GroFin, a privately-owned company specializing in SME finance and business development assistance, is a leading proponent of hybrid finance including for agro-processing, and has offices in eight countries across sub-Saharan Africa (GroFin 2010).

Box 7.7: Example of a shareholder loan

A rice-milling enterprise in Mali with an existing capital base of \$200,000, is seeking to upgrade its business by replacing its outdated machinery and including a new de-stoning and packaging machine. This new investment requires \$300,000 and additional working capital of \$100,000, making for a total investment size of \$400,000.

An investment fund agrees to provide \$100,000 financing in the form of equity for the investment, taking a 33% share in the enlarged company (with new total capital base of \$300,000). The enterprise owners and investment fund agree with the enterprise's owners that after a period of three years the fund will sell back its stake in the business to the owner at three times the entry price (i.e. \$300,000). In addition to the equity stake, the fund also provides a \$300,000 loan to the company at a low interest rate to cover the remainder of the investment, agreeing to take 3 per cent of the gross revenues of the business in return.

Assuming that the investment enables the company to grow its business through entering new markets, improving productivity etc., the value of the business increases to \$2 million over the life of the investment. The enterprise's owners still only need to repay \$300,000 to the investor for their stake, as opposed to the almost \$700,000 which the shares may be worth, and the investor has gained upside to growth in the business through royalty payments from revenues.

Capacity building and technical assistance

Building capacity of agro-entrepreneurs

Building capacity of both agribusiness entrepreneurs and existing or potential providers of finance to the sector is necessary. In order to have effective demand for finance for agribusiness, producers and entrepreneurs need to be aware of their financial options, and have the requisite skills to plan and manage capital. Areas to be addressed in this regard are awareness-raising, improving, business and financial planning management skills, and coaching for initial loans or investments. Technical assistance to improve the productivity and competitiveness of agribusiness is also of utmost importance.

Building capacity of banks

There is a necessary learning process for banks and other investors to become more familiar and comfortable with assessing risks in agribusiness enterprises. This

entails a progression, from banks developing assessment models and making decisions based on relationship lending, to relying on 'hard' data, and agro-entrepreneurs becoming more effective managers with deeper financial know-how. Providing data and expertise at low (or even no) cost through, for example, Central Bank or DFIs can help to ease market entry and build the outreach of banks. Linking technical assistance to entrepreneurs with loan provision is also a possibility. Technical assistance and capacity-building are not stand alone activities, and should be seen as components of an overall strategy for agribusiness development.

7.5. Conclusions

The importance of appropriate financing mechanisms for the development of agribusiness and commodity value chains in Africa should not be underestimated. All businesses require sufficient and appropriate financing to sustain and grow, whether they are small or large, whether they supply farm inputs or distribute agricultural outputs, or whether they operate in the formal or informal sectors. However, they often suffer from a suboptimal rate of investment for a variety of reasons – not least because the sector is perceived as risky and yielding unattractive returns. In this regard, mobilizing both traditional and innovative sources of financing constitutes one of the key pillars for agro-industrial development in developing countries. There have been great improvements in the outlook for the sector in recent years, and this chapter has outlined a number of options to build on successes and improve financing for agribusiness development on the continent.

Ultimately the onus of increasing investment and facilitating the financing of agribusiness in Africa lies with African policymakers, by making the sector more attractive and sustainably profitable. This requires a comprehensive and investment-friendly strategy for development of the sector, addressing each of the other pillars in this volume. Micro-level financing tools and innovative models play a great role, but the policy environment and large-scale resource mechanisms, such as umbrella funding that aligns public and private sector activities, are important. An important point to remember in building public-private partnership mechanisms for agribusiness development is that such mechanisms work best where the private sector is left to do what it does best, and the public sector plays a facilitative role.

8. Stimulating private participation

Franklyn Lisk

8.1. Introduction

The private sector has emerged as an increasingly important element in stimulating economic growth in developing countries, in response to opportunities for investment and business innovation, created by globalization and technological advances. Consequently, private sector development (PSD) has become a major focus of strategies for economic diversification and transformation, broadly endorsed by multilateral and regional development institutions, donor agencies and governments to foster economic development. Private enterprise is playing a crucial role in transforming fast-growing economies in Asia with significant employment creation and poverty reduction benefits.

In sub-Saharan Africa however, governments have mostly relied on public sector-led development strategies, using state-owned enterprises to drive industrialization. Consequently, in most economies, the private sector remains largely informal and relatively underdeveloped. A recent UNIDO/GTZ⁴⁵ study found that “high levels of informality persist throughout sub-Saharan Africa ...[and] informality in general seems to be highest in sub-Saharan Africa when compared with other world regions” (UNIDO & GTZ 2008 p.14). Although the informal sector is the main source of job creation in many countries in sub-Saharan Africa, thereby cushioning unemployment and destitution for millions of Africans, the vast majority of enterprises in this sector seldom grow sustainably. Jobs are usually precarious and earnings are generally very low (Bigsten *et al.*

45. Formerly GTZ, it is now known as GIZ (Gesellschaft für Internationale Zusammenarbeit).

2004; Flodman Becker 2004; International Labour Organization ILO 2002). Because informality is a major obstacle to economic growth, its transformation into a viable private sector is a pressing development challenge.

8.2. Potential of the African private sector

The private sector and economic growth

Given the existing state of affairs in most African countries, the realization of the potential of the private sector for economic development will require public sector interventions to enhance domestic capacity and capability in respect of physical and social infrastructure, human capital, financial systems, technology and governance. In addition, governments should put in place regulatory frameworks for tackling market failure. Hence, interventions to create an enabling environment for PSD have to be seen in the light of the wider discourse on the respective roles of government and markets in achieving desired development outcomes.

While the business climate in Africa is improving, to judge from the inclusion of Rwanda, Botswana, Kenya, Ghana, Liberia, Mauritius, Tunisia and Egypt among the top ten reformers in the annual World Bank's *Doing Business* rankings over the past five years, the cost of doing business on the continent is still the highest compared to other developing regions, according to the latest report (World Bank 2009d). Entrepreneurs in sub-Saharan Africa continue to face greater regulatory and administrative burdens, and have less protection of property and investor rights than their counterparts in other regions. Doing business in Africa is characterized by high transaction costs, due to small and fragmented markets; protracted and cumbersome administrative procedures and bureaucratic bottlenecks; poor physical and financial infrastructure; and very low transaction volumes. Interventions needed to remove constraints on PSD should be supported by efforts to enhance competitiveness; promote exports and facilitate intra-regional trade. Effective regional cooperation that stimulates increased intra-regional trade will allow African countries to exploit specialization and economies of scale, while attracting increased investment.

There is little doubt that the emergence of a credible private sector in Africa would impact positively on economic growth and poverty reduction in the region. Although African economies are still characterized by a dichotomous structure—typically comprising an underdeveloped rural and urban informal economy (Box 8.1) alongside a relatively small, organized modern sector—this dichotomy does not necessarily represent a major obstacle to realizing the full potential of the private sector. On the contrary, the underdevelopment of the informal economy in Africa—with vast unexploited resources and abundance of labour—provides opportunities for development of the private sector and for attracting private investment. In addition, Africa also offers large untapped markets and all the benefits of emerging economies, such as comparatively high rates of return and attractive possibilities for investment diversification.

Box 8.1: How informal is the African economy?

According to a new study of informality in the global economy (GTZ 2010; Schneider et al. 2010), the ‘shadow economy’ is estimated to be larger in sub-Saharan Africa than any other region. The median for SSA economies is 40.7 per cent of official GDP followed closely by Europe and Central Asia (40.3 per cent) and Latin America and the Caribbean (40.1 per cent).

The overall average of the shadow economy in 151 countries is shown to have increased to 35.5 per cent in 2007 from 32.9 per cent in 1999. Informality is lowest in Switzerland, US and Austria and greatest in Azerbaijan, Bolivia, and Georgia. Mauritius (23.5 per cent) has the smallest informal sector in sub-Saharan Africa, followed by South Africa with 29.5 per cent, Lesotho (32.1 per cent) and Namibia (32.5 per cent). The largest informal sectors in sub-Saharan Africa are found in the United Republic of Tanzania (60.2 per cent) and Zimbabwe (57 per cent). These estimates understate the real size of the informal sector in Africa, because the Schneider study explicitly excludes the informal household economy consisting of subsistence activities of household production and services. Schneider *et al.* define the shadow economy or informal sector as one that includes “all market-based legal production of goods and services that are deliberately concealed from the public authorities” for reasons such as:

- To avoid paying tax or social security contributions.
- To avoid compliance with legal labour market standards—minimum wages, maximum working hours, safety standards, etc.
- To avoid complying with administrative procedures, such as completing statistical questionnaires or other administrative forms.

According to the study, the main drivers of informality are:

- The tax burden on businesses and households—the greater the gap between the total cost of labour in the official economy and after-tax earnings from formal employment, the greater the incentive is to work in the shadow economy.
- Labour market regulations such as minimum wages or rules governing the hiring and firing of workers and labour market restrictions for foreigners also foster informality because they increase employment costs. Since these can be shifted to the worker, who bears the brunt of the regulatory burden such regulations are an incentive to seek informal employment.
- Where the informal sector is large, state tax revenues are reduced, and as a result, the quality of public goods and services suffers, especially expenditure on human capital (health and education) and public infrastructure. Accordingly, the more informal the economy, the poorer the state of infrastructure and the quality of human capital—both of which are crucial to enhancing agribusiness output and efficiency.
- The state of the ‘official’ economy also impacts on informality. The weaker it is, as in the case of recession, the more workers and entrepreneurs will try to compensate for ‘lost’ income from formal activities by seeking to exploit informal opportunities.

Informality is negatively correlated with *per capita* incomes—with the largest informal sectors in the world’s poorest region, sub-Saharan Africa, and the smallest in high-income OECD economies. This underscores the need to formalize Africa’s shadow sector to increase incomes, enhance productivity and raise tax-to-GDP ratios.

Source: Schneider *et al.* (2010)

8.3. The private sector and agribusiness development

Nowhere is optimism about the potential of the African private sector as a driver of economic growth more realistic than in agriculture, given the region's huge reservoir of arable land and rural labour. As mentioned in chapter 1, the slow transformation of African economies has forced many countries to continue to depend on agriculture for their economic well-being. The potential of the African private sector for responding to agro-based market opportunities is perhaps best illustrated by the situation of Kenya. Agriculture is the most important sector of the Kenyan economy, and is dominated by a vibrant private sector comprised mainly of small and medium-sized farming and processing operations. About three-quarters of Kenya's population depend on such operations for a livelihood and the sector is the major employer of labour in the country. Taken together, Kenya's farms, farm product processing and agro-industries generate about half of Kenya's GDP, a major proportion of which is derived from exports—mainly tea, coffee, fresh fruit and vegetables and cut flowers. The rate of agricultural growth in Kenya more than trebled from 2.0 to 6.7 per cent annually between 2003 and 2009, and the proportion of the rural population living below the absolute poverty line declined by 5 per cent over the same period (GTZ 2010). Sadly, however, the Kenyan experience is not typical of the continent as a whole.

Economic activity in agriculture is characterized by millions of rural people engaged in subsistence and low-productivity smallholder production and also by excessive dependence on the production and export of unprocessed primary commodities. Structural problems of low productivity, inadequate rural infrastructure, and poorly-integrated markets are serious constraints on the development of agribusiness and agro-industry and on entry to global value chains.

A large proportion of the region's agricultural production undergoes no industrial processing in the countries of origin (chapters 1 and 5). Important issues relating to investment in rural infrastructure, access to international food and agriculture markets, international competitiveness, critical linkages between agriculture, industry and services, and reduction in the vulnerability of smallholder farmers remain to be tackled. Given the enormous scope for expansion of agribusiness and agro-industry in sub-Saharan Africa, there is little doubt that private enterprise has the potential to stimulate growth and diversification if the right conditions exist.

With only about one fifth of Africa's potential cultivable land currently in use, investment in agribusiness and agro-industry would bring more land into sustainable production, while at the same time, continuing efforts to increase productivity in existing farmlands. The Guinea Savannah zone of Africa contains arguably the largest area of underutilized arable land in the world. Low population densities in many areas within this zone mean that there is scope for expanding and intensifying production systems needed to support large-scale agriculture and agro-industry. Enabling the private sector to play the crucial role of bringing international competitiveness and growth to African agriculture will depend on getting policies right, strengthening institutions, and investing in improved physical infrastructure and services that support on-farm production, as well as processing and export marketing.

Interest of foreign investors in African agriculture has been given a boost by the increasing global demand for food and agricultural products, mainly as a result of rising consumption levels in large emerging economies such as China and India and favourable world market prices. Following the sharp rise in the prices of agricultural commodities and food in 2008, some sub-Saharan African countries such as Ghana, Malawi, Rwanda, Senegal and Kenya have recorded strong growth in agricultural exports (UNCTAD 2010b), which suggests that agribusiness could become a primary driver of economic growth and employment, as well as an important contributor to poverty reduction in the region. It should however be noted that higher world food prices for basic staples like rice, cereals, wheat flour, and cooking oil could threaten food security potential in low-income net food-importing countries in the region, such as Benin, Eritrea, Cote d'Ivoire, DRC, Mauritania and Sierra Leone.

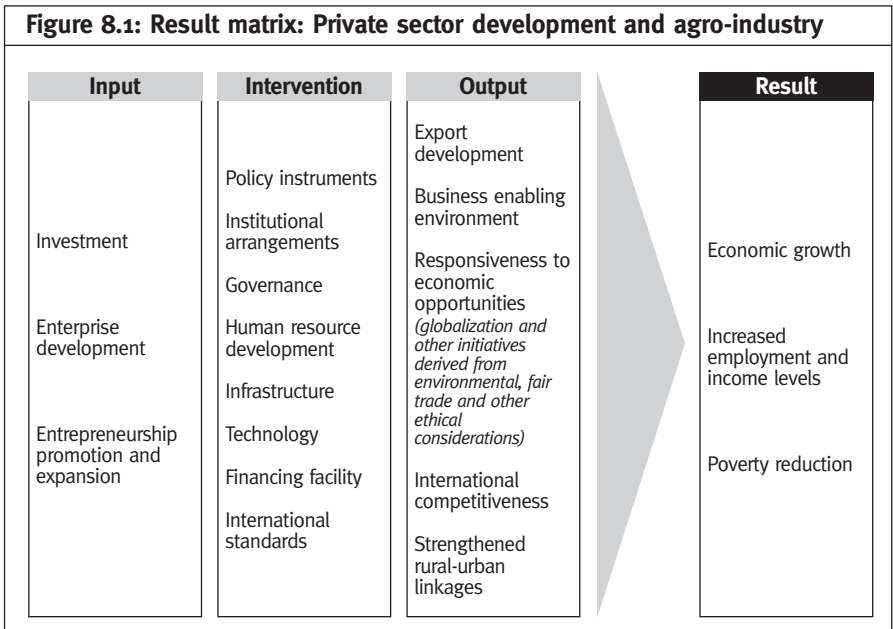
8.4. Conceptual framework

The conceptual framework presented below is based on a result matrix, which shows key input and output factors and the types of intervention required for PSD and investment in agro-industry, in order to achieve results that would impact positively on economic growth, employment and poverty. According to this conceptual framework, development interventions in the following three areas are required: (a) investment; (b) enterprise development; and (c) entrepreneurship promotion and expansion.

Because of imperfections in the market system, there are economic grounds for interventions to restore optimality. The aim is to correct imbalances and weaknesses and remove constraints, thereby providing appropriate conditions for private enterprise development and agro-industrialization. These conditions are linked to an array of critical policy issues and institutional arrangements pertaining to the legal and regulatory frameworks, infrastructure, human capital, technology; infrastructure, financing systems, governance, and partnerships.

The necessity of intervention for market failures legitimizes the role of the state as an important element underpinning private sector development. From Asian experience, governments can play a pivotal role in ensuring that appropriate policy frameworks and reforms are in place alongside effective institutions to improve infrastructure services and enhance financial mechanisms and management capabilities. The state also has an important role in providing incentives and support for the private sector to stimulate and leverage additional investment. In the specific context of agro-industry, this should be seen as part of the overall strategy to create a business-enabling environment; promote export development; and facilitate responsiveness of business to the challenges and opportunities arising from globalization.

The main underlying assumption of the conceptual framework is that economic liberalization and technological advancement present a new set of challenges for both enterprises and policymakers in sub-Saharan Africa. These challenges are embedded in a new approach to industrial policy as developed by Rodrik and Hausmann (Rodrik 2004a; Hausmann & Rodrik 2003). The new approach seeks to maxi-



Source: Authors' calculations, based on UNIDO (2009a)

mize the potential of the private sector for economic growth through investment in business opportunities, while minimizing the risks through the involvement of the public sector in generating policy initiatives for PSD (Sen & te Velde 2007).

New paradigms have evolved with this approach to industrial policy, such as the building of value chains, fostering learning strategies and promoting knowledge-based growth, alongside more established ones like investing in people and skills and exploiting economies of scale. Private enterprises in sub-Saharan Africa will assume a greater role for stimulating economic growth and generating productive employment—a responsibility that was almost entirely in the hands of African governments under conventional industrial policy. The new approach emphasizes ‘created’ competitiveness, in addition to inherited comparative advantages, and sees policy reforms in the business environment as the basis for creating conditions that would enable enterprises to compete internationally.

8.5. Investment

Investment requires savings, but in a significant number of African countries domestic savings are extremely low. Aggregate savings performance in sub-Saharan Africa has consistently fallen far short of Asian levels, and as a result countries have been heavily reliant on foreign capital and aid for investment (see chapter 7). Given Africa’s savings deficit, policymakers should prioritize fiscal incentives and macro-economic consistency to attract foreign direct investment. Global FDI flows have increased substantially since the 1990s, with the biggest increase—nearly six-fold between 2000 and 2007—recorded for net private capital flows to low-income countries (World Bank & FAO 2009).

Private sector investment decisions

In much of Africa in the immediate post-independence period of the 1960s and 1970s, foreign private investment was attracted through import protection, subsidized credit and tax incentives provided by the state, alongside regulations requiring private investors to obtain licences to import raw materials and remit foreign exchange earnings. While this type of industrial policy was effective initially for import substitution, it was inefficient in terms of returns on resources invested, consumer welfare and its contribution to economic growth and employment generation. This was because the investment involved was highly protected, heavily dependent on imported raw materials and with few backward linkages with the rest of the economy. The era of structural adjustment programmes in Africa (the 1980s and 1990s) produced investment policies that relied on market signals. This approach was intended to eliminate policy-induced distortions, such as overvalued exchange rates, high and variable import tariffs and quotas, price controls, and tax incentives and subsidies, in order to promote economic efficiency. In retrospect, it can be judged to have been inappropriate for fostering development and reducing poverty, and on the whole was unsuccessful even in terms of attracting foreign investment. Scant attention was paid to rural areas and the agricultural sector where poverty is concentrated.

The reduction of trade barriers, technological advances and lower transport costs associated with globalization, have provided better prospects and more options for private investors. As analysed in chapter 4, there are new opportunities for investing in agribusiness and for integration into value chains. These range from large-scale commercial cultivation and processing of food crops and energy crops for bio-fuel (UNIDO & FAO 2009), to medium and smallholder production of fresh fruit and vegetables and horticultural products for export to supermarkets abroad (Best & Mamic 2008; Omosa 2002). There are opportunities for stimulating private investment in the so-called 'green enterprise' initiative, which is linked to environmental protection (forest conservation, ecotourism, forest sector products, waste management and biomass renewable energy). There is scope, too, for private investment in 'fair trade' and organic production schemes designed to improve access to international markets for excluded or disadvantaged small producers and provide niche markets for certified products. Promising examples include the participation of local cocoa farmers in Ghana as co-owners of the 'Divine' chocolate business, and organic smallholder coffee producers in Uganda that offer farmers better prices and longer-term trading relationships.

A recent World Bank study, *Awakening Africa's Sleeping Giant* analysed prospects of sub-Saharan Africa for stimulating investment in agribusiness, based on comparison with a large agricultural region in Thailand and a similar one in Brazil. It concluded that the potential of Africa's Guinea Savannah zone to produce and process food and other agricultural products for global markets surpassed those of the two regions in Asia and Latin America respectively at a similar stage of development (World Bank & FAO 2009). This conclusion was based on the inherited comparative advantages of the Guinea Savannah zone, which are based on favourable physical, climatic and geographical factors including proximity to major markets⁴⁹.

Several countries in the region with large areas of arable land and in climatic zones that are watered by regular and reliable rainfall, such as Nigeria, Mozambique, Uganda, Ghana, Zambia, Zimbabwe and Sudan, are well placed to attract foreign private investment for large-scale production and processing of food and energy crops for biofuels. What is required for this potential to be realized are improvements in basic infrastructure and the overall business climate, which underscores the importance of providing a business enabling environment to stimulate investment. Some West African coastal countries—Senegal, Guinea-Bissau and Mauritania—and those that share Lake Victoria in East Africa—the United Republic of Tanzania and Uganda—have taken advantage of their location and created conditions for the processing of fresh fish and fish products for export to the EU. As mentioned in chapter 4, the export of Nile perch fish from East Africa, which began in the early 1990s, has evolved from artisanal operations into large-scale enterprises, including filleting and freezing plants which employ over 300 workers (Gibbon 1997).

The present weakness of the private sector in sub-Saharan Africa is due to a variety of factors, including lack of physical infrastructure, underdeveloped financial systems, an inappropriate macroeconomic policy stance, and the absence of a supportive legal and institutional framework. Overcoming these problems is intrinsically linked to the role of the public sector in providing an enabling environment for PSD. This role is illustrated by the successful examples of Ghana (Government of Ghana 2003; Arthur 2006) and Senegal (World Bank 2004b; Ofofu-Amaah 2000), both of which have made PSD an important element in their overall development strategy.

Public sector investment

The poor quality of rural infrastructure in most of sub-Saharan Africa constitutes a major obstacle to investing in agribusiness (chapter 9). In the past, public sector in Africa has traditionally accounted for most of all vital infrastructure investment in the region, although recent Chinese investment in SSA, mainly in mineral resources, in some sub-Saharan Africa countries has been accompanied by investment in associated infrastructure. Investment in infrastructure in remote rural areas, dependent on agricultural or agro-industry production to recover capital and operational costs, is unlikely to offer the kind of risk-adjusted returns required by private entrepreneurs.

Although governments are chiefly responsible for infrastructure investment, few African governments are in a position to finance the huge capital outlays necessary to eliminate the region's infrastructural deficit. They will continue to depend on

46. The study compared the potential of Africa's Guinea Savannah Zone (GSZ) for the growth of commercial agriculture with two relatively underdeveloped and landlocked agricultural regions in the developing world—the Cerrado region of Brazil and the northeast region of Thailand. The findings were that even though the GSZ has inherited comparative advantages with respect to good soil and climatic conditions and geographical location in terms of access to seaports, it has not been able to achieve the degree of international competitiveness in commercial agriculture that the two comparatively disadvantaged regions have achieved over the past thirty years. The main difference has been the lack of investment and technological input, which has prevented the GSZ from becoming internationally competitive and, hence, realizing its enormous potential as a major commercial agricultural producer and exporter. GSZ data used in the study were mainly for Nigeria, Mozambique and Zambia; the zone as defined by the World Bank covers several other countries, including most of West Africa and Angola, Sudan, Burundi, Malawi and U.R.Tanzania.

multilateral and regional development finance institutions as the main source of funding for this purpose. The African Development Bank (AfDB), in collaboration with Agence Française de Développement (AFD), the Alliance for a Green Revolution in Africa (AGRA) and the International Fund for Agricultural Development (IFAD), recently established an African Agriculture Investment Fund with a startup capital of 200 million Euros, specifically to finance rural infrastructure investment. The AfDB is also in consultation with UNIDO, FAO and IFAD, regarding an initiative by the three UN agencies to establish a financial facility for boosting investment in agribusiness and agro-industry, including rural infrastructure (see chapter 7).

Public-private partnerships

Public-private partnerships (PPPs) represent one possible—albeit partial—solution, but private sector participation is constrained because investment in rural public infrastructure is often costly and high-risk. An important challenge is to know when and where PPPs are value-adding propositions for infrastructure in market-oriented agro-industry development, and how best to formulate the financial and institutional arrangements for such collaboration. The use of PPPs for the provision of vital infrastructure should be approached from the perspective of state-business relations and wider development objectives, in which the partnership between the public and private sectors influences economic growth and poverty reduction through investments that promote economic efficiency and returns that reduce uncertainty and minimize the risk of business failures (Sen & te Velde 2007).

Beyond the provision of vital infrastructure, PPPs can be applied to agro-processing facilities. Since these are run as strictly commercial business operations, it is unlikely that the raising of capital for investment could be entrusted or transferred to a public body. The public sector is more likely to contribute in the form of land and physical structures through concessions or capital grants. The assumption is that private interests will assume the main commercial obligations and risks, leaving the state with the responsibility to ensure, so far as it is possible, that such projects will have a positive impact in job creation and poverty reduction.

Regional cooperation

Africa's infrastructure challenges in the areas of transport and energy should also be tackled at regional level. The North-South Corridor, involving several African countries and the Beira Agricultural Growth Corridor, which connects Mozambique with the wider region, is likely to reduce cost of production for countries involved. Similarly, cross-border transmission of hydroelectricity by high-tension power lines from Ghana to the neighbouring countries of Togo and Benin and from Mozambique to South Africa and other countries in region, are examples of regional cooperation that benefits infrastructure development. The Infrastructure Project Preparation Facility of the African Union/NEPAD, which is hosted and managed by the African Development Bank, supports the execution of large cross-border and regional infrastructure projects, which allow for pooled risk and lower net cost, as a strategy for encouraging the development and expansion of internal and regional markets and improving international competitiveness. Greater cooperation and

harmonization of economic policies within the region would enable African countries to enjoy more specialization and economies of scale than is possible in the small economies of several countries in the region.

Human Capital

Investment in human capital is highly relevant to PSD, overall economic development and industrial capabilities and competitiveness (UNIDO 2009b). Generally, the public sector plays a crucial role in the provision of education and basic technical and vocational training, and sees this as a necessary social sector investment linked to the attainment of development objectives, including poverty reduction. Investment in human capital in the SSA is relatively low, according to the United Nations Educational, Scientific and Cultural Organization (UNESCO) data which show that sub-Saharan Africa lags behind other developing regions in terms of school enrolment and availability of and access to training facilities. The human capital problem of low enrolment rates is further compounded by skill outflows through emigration of qualified African professionals and technicians to developed countries. Lessons from Asia suggest that fundamental to policies for attracting capital, were the availability and retention of an efficient and skilled workforce. Attention should be paid to both the quality of labour and the extent of labour market segmentation, which can affect the scale and location of private investment decisions.

8.6. Enterprise development

In the conceptual framework presented earlier, the enterprise is the basic organizing unit for economic activity in the context of the symbiotic relationship between PSD and economic growth. Enterprise development can have two important outcomes: it will generate employment opportunities for the poor, who live and work in rural areas, while also leading to the extension of basic social services to rural communities that are most in need⁴⁷. Promoting enterprise development in the region entails the removal of constraints on the transition from informal to formal, as well as appropriate measures at both policy and institutional levels to attract private investment. In addition, markets in many African countries have remained highly concentrated and protected, which acts as a disincentive for private investment and innovation. Examples of this tendency can be found in countries like Mozambique, Cameroon, Ethiopia, Eritrea, Uganda and Nigeria, among others where state-owned monopolies dominate their respective sectors and markets and even receive preferential treatment, which impedes entry of new enterprises.

Enabling Environment

Enterprise development in sub-Saharan Africa needs an overall enabling environment, which attracts private investment and allows enterprises to expand and operate efficiently. In the context of the complementary role of the public and the private sector in PSD, the assumption is that the state performs specific enabling

47. The expansion of enterprises can lead to increased investment in vital infrastructure, such as roads, water and electricity, which has public good qualities, providing benefits for surrounding communities. Furthermore, large rural agro-industry projects have sometimes included the provision of basic health and education facilities for (rural) workers and their families.

and regulatory tasks to encourage and facilitate enterprise development, without jeopardizing the functioning of the private sector. The significance of public sector support in creating an enabling environment for industry and business is widely recognized, and in this context, UNIDO is providing technical assistance to developing and transition economies for business development (Yumkella & Vinanchiarachi 2003; UNIDO & OECD 2004; UNIDO & GTZ 2008).

The International Labour Organization (ILO) has defined the role of government in this context as essentially three-fold (ILO 2003a):

- Government as a *regulator*: designing and implementing policies and laws and regulations that govern the activities of private sector enterprises—for example, private sector development and specific enterprise promotion policies, business registration procedures, industrial policy, taxation policy, trade and competition policies, labour and industrial relations policies, etc.
- Government as a *facilitator*: providing specific conditions and facilities that are conducive to private sector investment and enterprise development and bringing key stakeholders together—for example, the provision of business development services, including business parks and industrial estates.
- Government as a *promoter*: intervening directly through the allocation of (human, financial and physical) resources to achieve specific outcomes, such as encouraging entrepreneurship and innovation.

In performing these inter-linked functions, it is important for government to aim at integrating private enterprises into the overall economic and social development framework, so as to optimize the impact on employment creation and poverty reduction. The report of the Commission for Africa (2005) recommended that strategies for PSD and enterprise development should be presented as a coherent package of problem-solving instruments. The report recognized the importance of the public sector as the framer of policies and laws and the provider of support services for enterprise development. In addition to specific policies and institutional arrangements, the creation of an overall enabling environment for enterprise development requires favourable business environmental factors that are not determined by the internal capabilities of the enterprise. The most important of these business environment factors are:

- **Macroeconomic stability**: an analysis of data from the World Bank's Investment Climate Assessment (ICA) for Africa carried out in the early 2000s noted that most countries in the region "have a long way to go in building macroeconomic environments conducive to private sector development" (Eifert & Ramachandran 2004, p.23). Although the situation in the region has improved overall in recent years, inappropriate policies and poor economic management result in distorted factor prices, high inflation and exchange rate volatility—all of which create uncertainty and increase transaction costs.
- **Global market** conditions drive the demand for and prices of Africa's export commodities and influence inflation and price stability through volatile food and energy prices. Adverse terms-of-trade effects, as experienced during the global recession (2008-2010) contribute to slower output growth while volatility in capital flows of all kinds hinder economic development.

- **Financial system and institutions:** an efficient financial system is important for economic development and in mobilizing resources for investment. Shortfalls in the formal banking and financial systems, which deny or limit access to affordable working capital and suppliers' credit constitute a barrier to PSD and entry into the modern economy (see chapter 7). Analysis of the World Bank's Investment Climate Assessment data for nine African countries revealed that inadequacies and shortcomings of the financial system in countries such as Mozambique, Nigeria, Uganda, Eritrea and Zambia, were an obstacle to enterprise expansion (Eifert & Ramachandran 2004). The involvement of smallholders and small-scale producers in agribusiness is hampered by difficulties experienced in accessing reliable and inexpensive financing.
- **Political and social stability:** generally, a stable political and social environment is conducive to an enabling environment for enterprise development. This is evident from the effects of political instability in countries such as Sierra Leone, Liberia, Uganda, Ethiopia, DRC and Eritrea, all of which experienced a slowdown in their economy and downturn in business when they were affected by conflicts (Fosu 2003). On the other hand, countries like Botswana, Mauritius, Senegal and Ghana with stable political situations and institutions have been more successful in attracting FDI and promoting private sector development. The proper functioning of institutions, such as the judiciary, public administration and social services, is crucial for the creation of a politically and socially stable society that provides an enabling environment in which private investment can be attracted and enterprises thrive.
- **Governance:** political stability is closely related to good governance, and governance issues cover virtually all areas of the investment climate, including the direct interactions of the public and private sectors. Corruption, transparency, unclear or volatile regulations and nepotism can damage a country's investment climate. Some governments in the region have voluntarily subjected themselves to the governance peer review process, the African Peer Review Mechanism (APRM), established by the AU/NEPAD. Governance-related indicators compiled by Transparency International (Corruption Index) and the World Bank Group (Doing Business and Investment Climate Assessment indicators) point to shortcomings of a number of sub-Saharan African governments in terms of corruption, lack of transparency and accountability, poor quality regulation (World Bank 2004c; World Bank 2009d; Transparency International 2009). Improvements in governance can be pursued through cooperation between private and public sector actors, grounded in an institutional system based on formal and impersonal rules and respect for the rule of law.
- **Land tenure:** the communal ownership of land and lack of freehold tenure is common in many parts of Africa, and this can be problematic for private investment in agriculture and agribusiness, including for foreign investors, if not properly addressed. Analysis of World Bank investment climate survey data, which covered 9 countries in Africa—Eritrea, Ethiopia, Kenya, Mozambique, Nigeria, Senegal, the United Republic of Tanzania, Uganda, and Zambia—found that access to land is “almost universally a problem in the countries....surveyed” (Eifert

& Ramachandran 2004, p.43). The same study observed that accessing land can take up to a year in some countries and can be very expensive, even in the case of state ownership. The situation would be even more challenging in the absence of an adequate legal framework to facilitate transactions and protect property rights.

Business climate

The business climate is a complex of policy, legal, institutional and regulatory conditions that govern business activities—a subset of the enabling environment which, in addition to investment in basic infrastructure, includes the provision of incentives to encourage enterprise development, entrepreneurship and job creation. It essentially concerns the ease of doing business as measured, for example, by the World Bank/IFC's annual publication, *Doing Business*, which ranks countries accordingly. Only eight sub-Saharan African countries—Mauritius (ranked 17), South Africa (34), Botswana (45), Namibia (66), Rwanda (67), Zambia (90), Ghana (92) and Kenya (95)—are among the first 100 in the 2010 Ease of doing Business World Bank/IFC rankings. Another thirteen African countries—Ethiopia (107), Swaziland (115), Nigeria (125), Lesotho (130) the United Republic of Tanzania (131) Malawi (132) Madagascar (134), Mozambique (136), the Gambia (140), Cape Verde (146), Burkina Faso (147), Sierra Leone (148) and Liberia (149)—are ranked between 100 and 150, with the remaining 25 or so SSA countries appearing among the bottom 33 in the global ranking (World Bank 2009d).

Improvements to the business climate are clearly needed, especially where inappropriate regulation, delay in starting a business and registering property, excessive taxation, lack of fair competition and an unstable domestic policy environment restrict investment all combine to frustrate the development of markets and market access, and stifle entrepreneurship. Taken together, these factors not only pose severe obstacles to businesses, but also undermine international competitiveness.

Policy and institutional reforms to improve the business climate should therefore cover a wide range of issues, such as trade, finance and credit, taxation, industrial, labour and employment; regulations and procedures for starting and operating a business; and the administration of policies, laws and regulations are managed and monitored. Business climate reform can be politically challenging, and it is important as such for governments to take the lead and own the process. This process not only includes the creation of favourable overall policy and legislative base for investment, but also the decentralization of facilities and support services and measures for encouraging the participation of civil society in development, especially in rural areas. Local level participation in business could be particularly relevant in the reform of land laws and land tenure systems aimed at protecting customary rights, while at the same time opening opportunities for security of tenure for private investors.

The Viet Nam case in Box 8.2 highlights the need for planned action to improve the business climate, rather than relying solely on market forces and factor endowment to stimulate private investment. In business environments with high levels of risk and uncertainty, and where capital is scarce and costly and technology backward—as in many African economies—reliance on the market alone is unlikely to

result in investment in novel products and processes in response to new market opportunities. The appropriate role for industrial policy is to help fill the gap caused by the incompleteness of the market through improvements in the business climate mainly as a result of public action. This reflects Rodrik's conceptualization of industrial policy as a 'process of economic self-discovery', which involves cooperation between the public and private sectors with the aim of informing on business opportunities and providing policy initiatives to respond to those opportunities (Rodrik 2004a). The notion of 'discovery' relates to the process of finding out where action is needed and what type of action can optimize the response to prevailing business opportunities. The implication is that governments in sub-Saharan Africa should seek to provide a favourable business climate, by identifying feasible areas for policy intervention, and adopting policies that can facilitate desirable structural changes, without marginalizing the private sector or constraining enterprise initiatives.

Box 8.2: Viet Nam's case of business environment reform

The case of Viet Nam illustrates how the business climate can be improved, based on planned interventions that are linked to outcomes at different levels and aimed at creating jobs and reducing poverty. In 2003, the Vietnamese government set out to revise the existing policy and legal framework for business by combining all existing laws relating to the regulation of all types of businesses into two comprehensive laws, aimed at streamlining regulatory and administrative procedures and harmonizing the overall framework for investment and business. This involved eliminating the many distinctions between domestic and foreign investment, and ensuring that Viet Nam complied with relevant international agreements to facilitate its application to join the WTO. The two comprehensive laws—the Enterprise Law and the Investment Law—were enacted in December 2005 and technical assistance for their implementation was provided by the International Finance Corporation of the World Bank and channelled through the government-sponsored Mekong Private Sector Development Facility, in partnership with the business community and other development partners. There was an explicit focus on policy reforms and on changing the mindsets of stakeholders—investors, policymakers, lawmakers and the media—while also facilitating the legal framework for reform. The relevant new laws were passed on schedule and are being monitored with respect to impact on enterprise development and investment as well as on employment. In a related move in 2005, the government announced that it wanted to double the number of private sector enterprises from 250,000 to 500,000 by 2010, with the expectation that these new enterprises would create 2.7 million new jobs and help increase the quantity and quality of exports by the SME sector. With the assistance from UNIDO, the Agency for SME Development (ASMED) in the Ministry of Planning and Investment undertook a highly participatory and consultative process as the basis for preparing a Development Action Plan 2006-2010 aimed at improving the regulatory and administrative environment. The reform of the business environment has resulted in the establishment of a computerized one-stop business, tax and statistics registration system and the establishment of the Government Business Portal (www.business.gov.vn) that have greatly reduced the time and cost of business procedures and substantially lowered the cost of doing business in the country. Source: Donor Committee for Enterprise Development (DCED) 2008

Business advisory and support services

Traditional approaches to enterprise development have emphasized strengthening the business sector, by building the capacity of individual enterprises through the provision of specialized services to support management and operational activities. UNIDO's extensive research and technical cooperation engagement in this important area have shown that enterprise development in sub-Saharan Africa and other developing regions could benefit immensely from more broadly-conceived and demand-driven 'business advisory and support services' (Kennedy & Hobohm 1999; UNIDO & OECD 2004; UNIDO 2006c; UNIDO & GTZ 2008). These services can be delivered to enterprises through a mix of government or government-related agencies, commercial-oriented intermediaries and business membership organizations, such as business associations, chambers of commerce and industry, and cooperatives. The services provided relate to day-to-day operational activities, as well as to the more strategic capabilities needed by enterprises to address medium and long-term issues associated with improving access to markets and the ability to compete (UNIDO & FAO 2009; UNIDO 2010a).

Global value chains

Global value chains clearly provide unprecedented opportunities for producers in developing countries to become part of a complex chain that exists between local suppliers and global buyers for turning sourced raw materials and intermediate inputs into retailed products (chapters 4, 5).

The phenomenal growth of global agro-food business and the internationalization of the food retail sector in recent years augurs well for the participation of agro-producers and processors in sub-Saharan Africa in global value chains. This, of course, will depend on upgrading of local enterprises' capabilities with regard to product quality, cost-effectiveness and efficiency of delivery and on improving employment, safety and ethical trading standards—for which the public sector has a crucial role to play in terms of providing advice and support services in the overall context of an enabling business environment.

Cooperatives

The potential of cooperatives in agro-industry is particularly relevant for encouraging economic efficiency and social welfare at local level, which could be useful for helping the rural poor to move out of poverty and creating wealth in their communities. Cooperatives have a long history on the African continent and have been a significant part of agricultural production in many African countries. The structure of cooperatives fits well with the communal cultures of rural Africa and is amenable to addressing concern for communal welfare at the local level.

During the colonial period, cooperatives were government-sponsored and served as a strategic tool to group rural producers into clusters, so that essential export commodities, such as coffee, cocoa and cotton, could be collected more cost-effectively. In the post-independence era, the cooperative movement in many countries suffered a decline and is not as active as it used to be in the region as a whole.

More recently, there are signs of a revival of cooperatives in sub-Saharan Africa, based on a realization among both donors and national policymakers that this type of producer organization can play an important role in supporting rural development objectives including poverty reduction.

Already, there is evidence of cooperatives scaling-up and diversifying their activities and membership to take advantage of the opportunities created by globalization, and some are becoming viable private enterprises in the agribusiness sector. Case studies of cooperatives in 12 African countries—including Kenya, Uganda, Ethiopia, Ghana, Nigeria, Senegal, South Africa, Niger, Cape Verde, Rwanda, and Egypt—covered by an ongoing ILO project, 'CoopAfrica', funded jointly by the UK Department for International Development (DFID) and the Swedish International Development Cooperation Agency (SIDA) (Box 8.3), point to this revival of cooperatives and highlight an emerging pattern, based on horizontal networks of small farmers and producers with solid vertical linkages with private sector agribusiness structures (Develtere *et al.* 2008).

Some of the cooperatives in the ILO study have become vehicles for the production of high-value food crops and fruits and vegetables, cut flowers, fisheries and aquaculture, along the lines of similar activities now well-established in Kenya (Omosa 2002). Becoming organized into cooperatives can also be useful for the development and upgrading of agricultural value chain, serving as a practical way through which rural producers and entrepreneurs can be involved and empowered by being part of the management of value chain operations at local level (UNIDO 2001; Gibbon 2001; Humphrey 2005; ILO 2006). The ILO study concluded that cooperatives in Africa are about to enter a new phase of renaissance, in response to opportunities in global and regional markets.

Box 8.3: The revival of cooperatives in Africa

Under a joint DFID and SIDA-funded technical cooperation project 'Cooperative Facility for Africa—CoopAfrica', the ILO is providing support for cooperative revival and development in about a dozen countries in Eastern and Southern Africa. The ILO project works with other UN organizations, such as FAO and UNIDO, and closely associates cooperative internationals like the International Cooperative Alliance and the Committee for the Promotion and Advancement of Cooperatives (COPAC) with its activities. There are already signs of a revival in the form of a number of viable cooperative enterprises in agriculture on the continent—ranging from coffee producers in Ethiopia and Rwanda, cocoa farmers in Ghana, tea producers in the United Republic of Tanzania and South Africa to dairy, fish and other food marketing businesses in Kenya, Senegal and Egypt, as well as rural savings institutions in Uganda and Rwanda. Most of these are demand-driven and market-oriented businesses and some have found market niches and developed marketable products in response to opportunities in the global and regional economies. There are good reasons to believe that with support and the right conditions, cooperative enterprises in Africa can play an important role in creating sustainable employment and in reducing rural poverty through their activities as service providers and producers in agro-industry.

Sources: Develtere *et al.* (2008); ILO (2009)

Export processing and free trade zones and investment parks

Export processing and free trade zones (EPZs) have been used to varying degrees of success by countries in Asia (Thailand, Malaysia, Indonesia, China, Sri Lanka, Taiwan, Rep. of Korea, Philippines), Latin America (Costa Rica, Dominican Republic, Panama), the Middle East (Bahrain, UAE, Qatar) and in Africa (Mauritius, Kenya, Senegal) for attracting foreign investment and diversifying their export base (ILO 2003b). If EPZs are to play a major role in driving agribusiness, significant and tangible backward linkages to domestic agriculture in operations, such as the clothing industry must be developed. Unless and until such linkages are developed the EPZ model is unlikely to play a significant role in boosting agro-processing activity in SSA.

The provision of infrastructure and common services by government in the form of industrial estates and business parks, together with fiscal incentives and similar inducements, can nevertheless be applied to labour-intensive agro-industries as part of an export-led growth strategy. The significance of the investment park model for industrial development hinges on the combination of internal linkages, through the provision of local business services, and external linkages, through integration into the world trading system.

A sophisticated example of the industrial estate/investment park model is the Bahrain International Investment Park, which is an initiative established within the framework of the Gulf Cooperation Council (GCC) to provide good quality facilities and business services to foreign investors, who want to have access to various GCC and regional markets. With easy access to the airport and seaports, the Bahrain Investment Park offers unique incentives, including 100 per cent foreign ownership, exemption from all taxes for ten years, no restrictions on recruitment and repatriation of capital, and has its own dedicated customs services and on-site management team within the industrial estate. While the possibility for replicating such a Bahrain upmarket version of the investment park in most of SSA may not be feasible, the principle of the approach is nevertheless relevant for stimulating private investment in agro-industry.

8.7. Entrepreneurship promotion and expansion

Entrepreneurship is essentially about human creativity and innovation. The promotion of an entrepreneurship culture or spirit in a society concerns efforts made by governments and private institutions to stimulate and enhance the capacity of individuals and business to create, innovate and expand. The culture and institutions of a society can, therefore, determine the degree of entrepreneurial spirit. Looking at entrepreneurship in terms of people taking initiatives or seizing opportunities to set up and manage their own businesses, there is indeed a long and strong tradition of entrepreneurship culture in many parts of Africa—as typified by the great markets of West Africa. Ironically, by most measures, it is in Africa that entrepreneurs face the biggest obstacles to setting up formal sector enterprises. While the informal sector meets an important need, sustaining the majority of poor families in sub-Saharan Africa, it is clear that the benefits of economies of scale and access to services are missing for local entre-

preneurs who are unable to grow and move their businesses into the formal economy.

The challenge of promoting entrepreneurship in Africa may therefore relate more to the removal of legal, financial and structural obstacles affecting the development of entrepreneurial capacity, than to provision of formal training per se. This is not to underestimate the importance of entrepreneurship education and training programmes, such as those that have been developed and successfully implemented by the ILO, UNIDO and other technical assistance agencies in many countries in the region since the late 1960s, but rather to recognize that capacity to make effective and timely business decisions may be stifled by bottlenecks other than lack of entrepreneurial skills and knowledge. In stimulating enterprise development, governments should therefore pay equal attention both to the removal of obstacles to entrepreneurship and to the provision of basic public goods that are indispensable for promoting and reviving the entrepreneurial spirit. Measures to overcome obstacles to private sector growth and entrepreneurship were identified by the UN Commission on the Private Sector and Development (UNDP 2004).

In the typical scenario of high unemployment among school leavers and young people found in many African countries today, there is a need to impart entrepreneurial knowledge and skills as part of the transition from school to the world of work. The expectation is not that young people will immediately start a business after leaving formal education or become self-employed; rather, the purpose of entrepreneurship education is to motivate youth to consider and explore the possibility of becoming an entrepreneur as a career option. In this regard, the ILO's Know About Business (KAB) programme, which is now being implemented in over 40 countries in Africa, Asia and Latin America and the Caribbean, is linked to the organization's wider technical and vocational education and training and enterprise development programmes (ILO 2007). Through interactive and participatory teaching methods and adaptations linking entrepreneurship education to general secondary and higher education curricula, KAB aims to develop entrepreneurial skills, attitudes and mindsets among young men and women.

8.8. Conclusions

Investment in agribusiness and agro-industry has the potential to be a powerful driver of sustainable pro-poor growth in African countries, if the growth and employment benefits from investment in the sector are broadly based and widely shared. For this reason, close attention should be paid to the policies and institutions used in the transformation of low-productivity, subsistence-oriented farming systems to efficient market-oriented production systems. It is equally important to focus on the factors that affect the size and distribution of employment and income benefits generated as a result of the participation of private sector enterprises in the transformation process.

The expansion of agribusiness and agro-industry in Africa, whether by small-scale producers or large-scale businesses, will affect poverty reduction in three main ways:

- Employment opportunities and incomes of those either directly involved in the process or through associated value chains.

- The price of food and other basic needs in the consumption baskets of the poor.⁴⁸
- The collection of tax revenues that can be used to deliver basic social services to the poor.

The experiences of countries like Brazil and Thailand in agribusiness development and promotion show that a number of factors are critical in determining the extent to which the participation of the private sector in agro-industry will contribute to poverty reduction. These include the macroeconomic environment; the land-tenure system; the willingness and capacity of government to invest some of the growth revenues from agro-industry in the provision of basic social services in rural areas; and the impact of growth on the political and social integration on regions previously isolated from the rest of the country (World Bank & FAO 2009).

There are grounds for optimism regarding the achievement of pro-poor growth through enterprise development and investment in agribusiness in sub-Saharan Africa. With the opening up of new fast-growth markets particularly in China, India and other parts of Asia, and the adoption of new technologies and products, Africa has the opportunity to achieve agribusiness-driven growth. However, longstanding challenges facing the region—low levels of human resource development, poor rural infrastructure, weak market linkages and vulnerability to external shocks—along with more recent ones linked to political issues and economic conditions brought about by globalization, such as fragility of the public sector and unfavourable and inequitable trade regimes, must be resolved. Improved investment and a conducive business climate should go a long way towards addressing these challenges, and creating the right conditions for the private sector to play the driving role in the exploitation of Africa's untapped potential in agribusiness. At the same time, public sector policymakers should continue to play an active role by providing the vision, the strategy, the long-term commitment and the enabling environment needed to foster private sector investment.

48. See earlier comment in this chapter on impact of rising food prices for net food-importing countries.

9. Improving infrastructure and energy access

Murefu Baresa, Abdul Kamara, John C. Anyanwu and
Gil Seong Kang

9.1. Introduction

Infrastructure enhances the competitiveness of an economy and generates a business environment that is conducive to agro-industrial growth and development. Good infrastructure efficiently connects agro-industrial firms to their customers at the market end and suppliers from the production end and enables the use of modern production technologies. The level of infrastructure development greatly influences trade flows, costs, and competitiveness. Access to reliable and appropriate infrastructure is an essential enabler in the agribusiness value chain. On the other hand, deficiencies in infrastructure create barriers to productive opportunities and increase costs for all levels (small, medium or large-scale) and types of agro-industrial firms.

The relevant infrastructure for agro-industrial development includes energy, transport and water supply. They are considered vital social capital and because of their broad availability, it is expected that national governments should provide such infrastructure from its national income or foreign direct investment to accelerate industrial development and improve standards of living. In the recent past, information technology (IT), telephones, and internet facilities have also been considered as essential aspects of infrastructure required for agro-industrial development. However, it is more realistic to expect different impacts from the different types of infrastructure investments, and under different investment circumstances, because the size of opportunity costs varies according to the types of infrastructure engaged and circumstances concerned, such as geography, economic and institu-

tional development stage. Infrastructure requirements also vary depending on the market orientation of the agro-industry. For export-oriented agribusinesses, cold storage and refrigerated transport facilities, railroads and ports are crucial.

This chapter focuses first on the status of each type of infrastructure in sub-Saharan Africa compared to other regions of the world. It is recognized that these infrastructures are important for other non-agricultural sectors of the economy, but also recognizes the costs and non-competitiveness of African firms and agro-industries in the local and global market due to poor infrastructure. The chapter concludes with some recommendations.

9.2. The status of infrastructure

A broad review of the literature suggests that private sector agribusiness investments are responsive to most of the factors influencing investments in other sectors of the economy. These factors include good infrastructure, as well as access to markets and natural resources (see chapter 5), and a stable macroeconomic and political environment (see chapter 3). Unfortunately, Africa's basic infrastructure remains a major stumbling block to the sectors growth and development. Infrastructural gaps are wide compared to other regions of the world, as we can see from the following review of the status of various types of infrastructure on the continent.

Transport infrastructure

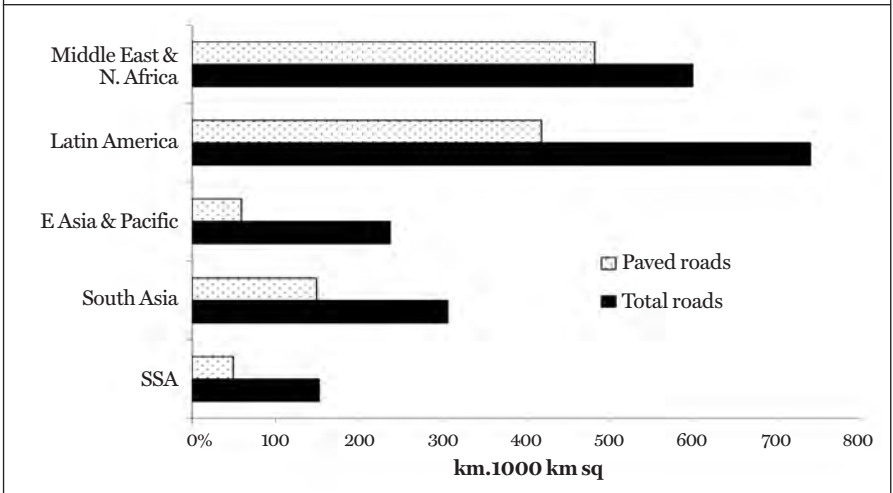
Transport infrastructure plays a central role in economic growth and poverty reduction. Inadequate transportation options; poor road, rail and air network distribution or the absence of adequate cold storage facilities are major challenges confronting agro-industrial development. Enhanced access to road, sea, air and rail freight will provide multimodal transportation that is essential to ensure that agribusinesses in sub-Saharan Africa can compete globally.

Road infrastructure and road density are poor when compared to other parts of the world. Only 19 per cent of the estimated 1.5 million km of roads in sub-Saharan Africa is paved, which contrasts sharply with 30 to 40 per cent in Latin America and South Asia respectively (AfDB & OECD 2006). In Africa transport costs are among the highest in the world. The relatively low level of intra-African trade (chapter 5) is attributable mainly to transportation bottlenecks. The poor state of road infrastructure raises serious concerns in many countries with 63 per cent of Africans interviewed from 35 countries indicating their dissatisfaction with the road network (Gallup 2008). These concerns relate not only to cost but also to safety.

In addition to low density (Figure 9.1) and poor-quality road systems in individual countries are seldom connected to networks in adjacent states, although efforts are being made to develop regional transport corridors. Enhanced regional road connectivity is a priority recognized by the New Partnership for Africa's Development (NEPAD), though little progress towards this goal has yet been achieved.

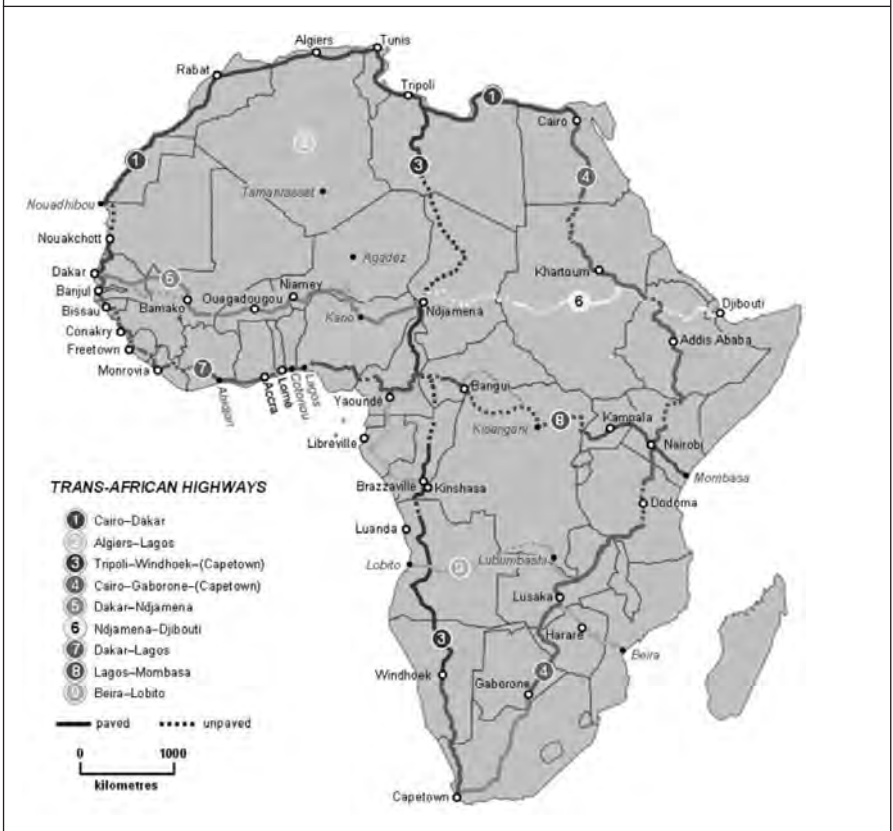
The current state of road networks and integration on the continent is illustrated in Figure 9.2. Estimates suggest that intra-African trade could treble from \$10 billion to \$30 billion annually when the Trans-African highways are fully completed (UNECA *et al.* 2010).

Figure 9.1: Comparative road densities



Source: UNIDO with data from Yepes *et al.* (2008)

Figure 9.2: Trans- African highways



Source: Parry 2008

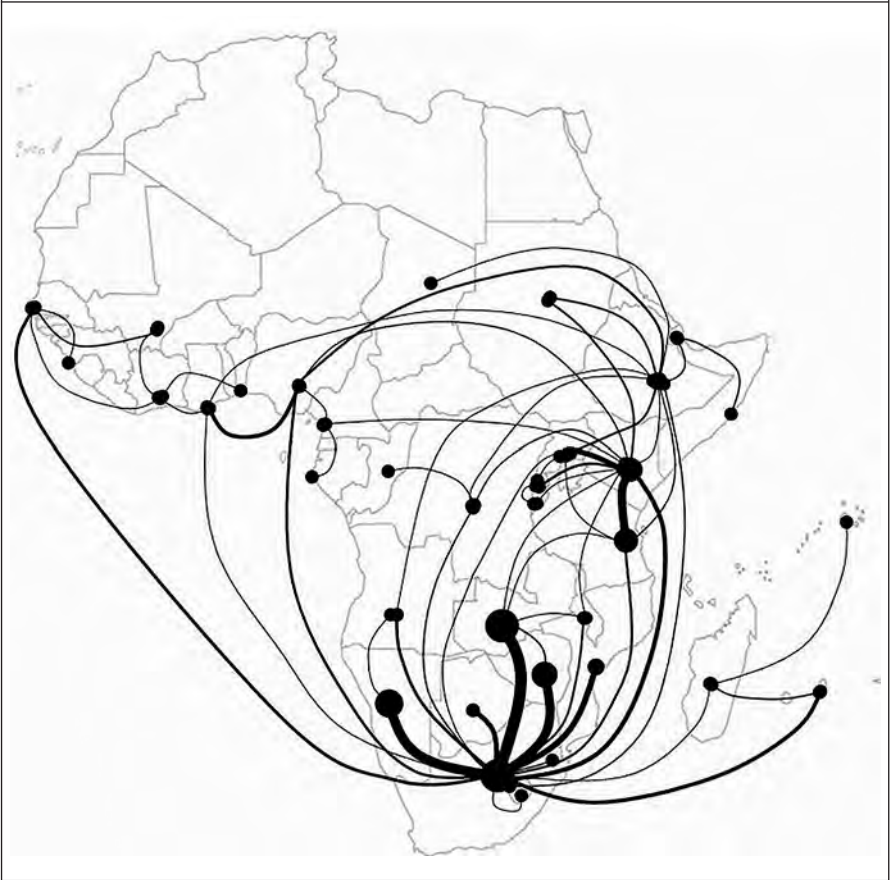
In terms of air transport, Africa accounted for 5.2 per cent of global air passenger traffic and 3.6 per cent of freight traffic in 2004. Africa's air transport grew 6 per cent between 2001 and 2007, accelerating to 11 per cent in the latter half of the period and translating into over 120 million seats annually (Bofinger 2008). The main air transportation hubs are in Ethiopia, Kenya and South Africa—the countries that own the three major African carriers (Figure 9.3)—but the development of the industry as a whole has long been stifled by non-viable, state-owned operators, dependent on government subsidies and patronage. In 1999, the Yamoussoukro Decision sought to address the problems of poor connectivity, disparate regulations and different standards while facilitating market liberalization and fair competition. While this has yet to be fully implemented, there are signs of improvement with an increase, especially in Central and West Africa, in the number of flights operated by carriers that do not belong either to the country of origin or the country of destination. These flights now account for 30 to 40 per cent of passenger seats in these regions (Foster 2008).

Airfreight plays a growing role in the competitiveness of high-value, time-sensitive cargo in global value chains. A rare success story emanates from Kenya. Kenya is by far the largest exporter of fresh vegetables in sub-Saharan Africa and its market share in the EU is second only to Morocco. It also exports different kinds of semi-processed vegetable products and some fruits and juices. In addition, the country is the largest exporter of cut flowers in Africa and one of the largest in the world. Investments in logistics infrastructure for air-freighted perishable exports and in quality and food safety assurance systems have been instrumental to Kenya's export diversification success, helping to attract private sector investment. The establishment of a well-staffed national plant inspection service (KEPHIS) in 1997 has played a key role (Kjöllerström 2007).

An improvement in African air transport in terms of geographic coverage and frequency would greatly benefit Africa's participation in both regional and global value chains for agro-industry products, which require fast and timely delivery for successful market access.

Rail transport, meanwhile, has the distinct advantage of transporting relatively large volumes of agro-industrial products within and across borders at relatively cheap cost and energy efficiency. But rail networks in Africa are still disconnected, and many are in poor condition. In fact in many African countries, rail transport has remained colonial legacies with little or no improvements in the aging infrastructure nor has there been an addition to routes to improve transportation. The total African rail network size is around 82,000 kilometres, of which about 69,000 kilometres are currently in use, with the remainder closed due to war damage, natural disasters, or general neglect and lack of funds. Traffic densities on sub-Saharan railways are generally low. Specialized mineral lines in West Africa and South Africa—particularly the Spoornet coal and ore export lines—carry more than half the railways' total freight (as measured by net ton kilometres⁴⁹) (Bullock 2009).

49. 'Ton kilometre' is a freight measure and refers the service of moving one metric ton (1,000 kg) of cargo a distance of one kilometre.

Figure 9.3: Top 60 international air routes within SSA

Source: Bofinger (2008)

Despite relatively high construction costs, rail networks have economic and social advantages over roads. On average, railroads are three times more fuel efficient than trucks, and railroad fuel efficiency is improving all the time. Railway systems significantly alleviate highway congestion, therefore enhancing road safety. A single intermodal train is able to take up to 280 trucks (equivalent to more than 1,100 cars) off highways; while a train carrying other types of freight takes up to 500 trucks off highways (AAR 2010). With the growing impact of climate change and oil depletion, railways have emerged as one of green transportation solutions. According to the US Environmental Protection Agency (EPA), it is estimated that for every ton-mile⁵⁰, a typical truck emits roughly three times more nitrogen oxides and particulates than a locomotive.

Due to its ability to carry large volumes of commodities, railway transport can be relied upon for supply of inputs and for distribution and marketing of products

50. 'Ton mile' is a freight measure commonly used in the United States. It refers to the service of moving one short ton (2,000 lb / 907kg) of cargo a distance of one mile (1.6km).

from agro industries. But timely and adequate handling processes at the railway stations are critical ancillary services that are required to ensure efficiency in railway transportation. Railway transport also complements sea transport especially for export-oriented agro-industries.

Sea transport: Some 95 per cent of Africa's international trade passes through ports (UNECA et al. 2010). In all, Africa has some 80 ports, mainly small units with few having the capacity to handle large ships. Ports in SSA anchor the transport corridors that provide links to the interior. Sea transport is increasingly dominated by container transport in Africa, which doubled between 1995 and 2005, mainly in Central and West African ports, followed by East Africa and Southern Africa (Ocean Shipping Consultants Ltd. 2008). This type of transport has a great potential for improving interregional trade and Africa's participation in regional and global value chains for bulky products unsuitable for air transport. In addition to sea transport inland waterways transport provide an inexpensive, energy-efficient and environmentally friendly type of transport. Although these are the weakest part of the African transport system they have great potential for accelerating transport linkages especially with landlocked countries (LLCs) (UNECA et al. 2010).

Transport infrastructure in landlocked countries of sub-Saharan Africa

There are 15 LLCs in Africa, which, on average, spend almost twice the proportion of their export revenues on transport and insurance costs than developing countries as a whole, and three times more than developed countries (UNECA et al. 2010). Such transport and insurance costs represent more a restrictive trade barrier than tariffs in developed countries, exceeding these by a factor of three. With a view to addressing the special needs of LLCs the United Nations launched the Almaty Programme of Action within the context of the *Global Framework for Transit Transport Cooperation for Landlocked and Transit Developing Countries*. Its objectives are to secure access to and from the sea by all means of transport for LLCs; reduce costs and improve services; reduce the delivered costs of imports; address delays and uncertainties on trade routes; develop adequate national networks; reduce loss, damage and deterioration en route; open the way for export expansion; and improve road transport safety and security. To achieve these goals the programme focuses on five priority areas: transit policy and regulatory frameworks; infrastructure development; trade and transport facilitation; development assistance and implementation.

In sub-Saharan Africa, a number of trade and transit corridors have been built to link countries, economic locations and ports, thus promoting intra-African and export trade through the use of efficient transport and logistics services (Table 9.1). Corridors are intended to reduce border delays and proliferation of road checkpoints and other obstacles that increase costs and hamper trade. The impact of a corridor should be reflected in reduced transit time and enhanced flexibility as well as the diversity of services available on multimodal routes (UNECA et al. 2010).

It is expected that these corridors will play a major role in improving the scope for efficient agribusiness value chains in LLCs, particularly with regard to the selected corridors illustrated in Box 9.1.

Table 9.1: Main corridors in Africa		
Corridor	Distance	Remarks
Dakar – Mali	1,250 km	Rail
Abidjan—Burkina Faso—Mali	1,200 km	Multimodal options to Ouagadougou, then road
Tema/Takoradi—Burkina Faso—Mali	1,100 km to Ouagadougou	Road
Lome—Burkina Faso—Niger/Mali	200 km	Road
Cotonou—Niger—Burkina Faso—Mali	1,000 km up to Niger	Multimodal options
Lagos—Niger	1,500 km	Road
Douala—Central African Republic – Chad	1,800 km	Multimodal
Pointe Noire—Central African Republic—Chad	1,800 km	Rail/river
Lobito—DRC—Zambia	1,300 km	Not currently used
Walvis Bay—Zambia—DRC (Trans-Caprivi)	2,100 km to Lusaka	Road
Walvis Bay—Botswana—South Africa (Trans-Kalahari)	1,800 km	Road
Durban—Zimbabwe—Zambia—DRC (North-South Corridor)	2,500 km to DRC	Multimodal options available
Maputo—South Africa	600 km	Multimodal options available
Beira—Zimbabwe—Zambia—DRC		Multimodal options available
Dar es Salaam—Rwanda—Burundi—Uganda—DRC (Central Corridor)	1,400 km to Kigali, 1,600 km to Kampala	Multimodal options available
Mombasa—Rwanda—DRC (Northern Corridor)	1,200 km to Kampala, 2,000 km to Bujumbura	Multimodal options available
Berbera—Ethiopia	850 km	Road

Source: UNECA *et al.* (2010)

Box 9.1: Main transport corridors to landlocked countries

- **The Northern Corridor** links LLCs of Burundi, Democratic Republic of the Congo, Rwanda and Uganda to the Kenyan seaport Mombassa and also serves the northern part of the United Republic of Tanzania, southern Sudan and Ethiopia.
- **The Central Corridor** comprises a multimodal transport network consisting of the Port of Dar es Salaam, the 1,254 km Dar es Salaam-Kigoma railway, the Tanganyika water transport to Bujumbura and DRC; as well as the road network

from Dar es Salaam through Dodoma, Singida, Nzega and Lusahunga to Rwanda and Burundi.

- **Dar es Salaam Corridor** linking port Dar es Salaam (United Republic of Tanzania) to Lusaka (Zambia) and Lilongwe (Malawi).
- **Walvis Bay Corridor** connects the LLCs of Botswana, Zambia and Zimbabwe to Walvis Bay Port in Namibia as well as to outlying markets of DRC and South Africa (Gauteng region).
- **Maputo Corridor** is a multimodal transport system consisting of a toll road, a railway service, and a gas pipeline connecting the Port of Maputo in Mozambique to the industrial centre of South Africa (Gauteng).
- **Abidjan-Lagos Corridor** is one of the busiest corridors in West Africa linking five countries—Côte d'Ivoire, Ghana, Togo, Benin and Nigeria through the harbour cities of Abidjan, Accra, Lomé, Cotonou and Lagos.

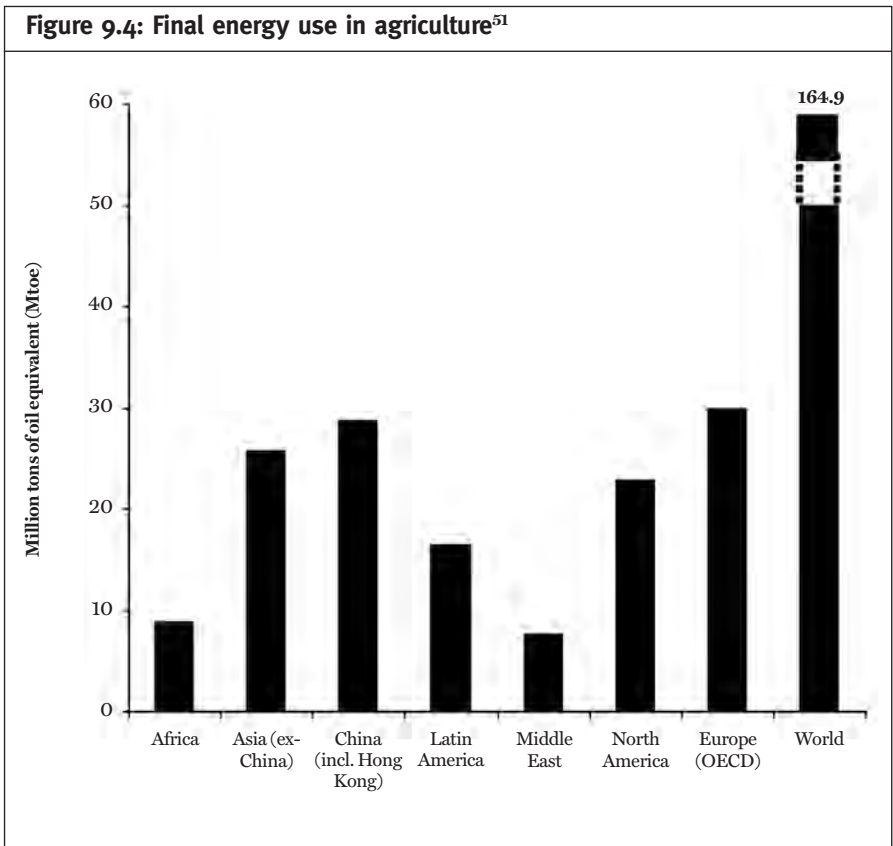
Source: UNECA *et al.* (2010)

9.3. The status of energy access

Energy is key to agro-industrial development in sub-Saharan Africa. Agro-industrial production, processing and transportation all require energy services to function in such processes as drying, refrigeration, pumping, heating, grinding and packaging. There are various sources of energy and Africa is endowed with resources vast enough to meet all its energy needs. These include electricity, biomass energy (from plants), fossil fuel (coal, oil and natural gas), geothermal energy, hydro power and ocean energy, nuclear energy, wind energy, solar energy, and wood. Despite its vast resources, Africa has issues and challenges with quality, reliability and affordability of energy supplies.

Hydroelectricity is by far the single biggest source of electricity in a number of countries. The region possesses some of the largest water courses in the world—the Nile, Congo, Niger, Volta and Zambezi river systems. The hydro potential of the Democratic Republic of Congo alone is estimated to be sufficient to provide three times as much power as Africa currently consumes (United Nations 2005). This potential remains largely untapped. During droughts, countries that depend on hydroelectricity ration power to relieve generators, transformers and cables—such was the case with Ghana in the late 1990s. Wars have left equipment damaged and transmission lines cut. A large portion of Liberia's generation and distribution infrastructure was damaged or destroyed during its long civil war and the national electricity company estimates it will cost more than \$107 million and take over five years to fully restore the system; Sierra Leone's Bumbuna hydroelectric project was nearly complete when civil war disrupted construction (United Nations 2005).

Blackouts are therefore routine in almost all African countries, grossly affecting the competitiveness of agro-industries. Electricity outages increase operating costs, disrupt production and reduce profitability for agro industries in the continent (see section 9.3). The bulk of power plants and transmission facilities were built in the 1950s and 1960s. Little investment and maintenance has left the infrastructure creaking at the seams. Nigeria, a prime example, operates at one third of its installed capacity due to aging equipment (United Nations 2005).



Source: Authors with data from IEA (2010a)

The distinction between energy *per se* and energy services is critical when devising strategies to match the supply of energy to developmental needs in any sector including agro-industry. It is estimated that no more than 20 per cent, and in some countries as little as 5 per cent, of the population in Africa (excluding South Africa and Egypt) has direct access to electricity. This figure falls to 2 per cent in rural areas. Demand is expected to grow by about 5 per cent annually over the next 20 years (United Nations 2005). Due to excess demand, service delays for electricity impose additional costs to agro-industrial firms and may act as barriers to entry and investment. It is therefore critical, for Africa to build facilities to provide power for agro-industrial development.

Oil and gas reserves (another source of energy) are concentrated in the north and west of Africa. By contrast, virtually all of Africa's coal reserves are in the south. Geothermal resources are largely in the Red Sea Valley and the Rift Valley. Much of Africa is well exposed to sunlight—solar energy could be particularly useful in areas far from national grids (United Nations 2005).

⁵¹ The source combines agriculture and forestry sectors.

Africa utilizes 451 million tonnes of oil equivalent (Mtoe) in total final consumption a year or only about five per cent of total global energy usage (IEA 2006). This low energy uptake is in stark contrast to the continent's under-exploited energy resources. Africa accounts for a mere 1.3 per cent of installed world solar energy, while only four countries out of the 53 have started exploiting geothermal sources, and only 7 per cent of hydroelectric power potential is currently utilized (AfDB & OECD 2004). The bulk of Africa's energy is supplied from biomass sources, mainly fuel wood and charcoal, which account for up to 80 per cent of final energy supply in many sub-Saharan Africa countries (Karekezi *et al.* 2004), though usage rates are lower in North Africa. The agro-industrial sector in Africa utilizes between 34 and 49 Mtoe per year, or between 5 and 7 per cent of total final energy consumption. Agriculture⁵² itself currently utilizes about 9 Mtoe compared with the global agriculture sector use of about 165 Mtoe (Figure 9.4).

The energy sector in the continent is an opportunity for agro-industrial investment in sustainable ethanol, electricity cogeneration, and thermal heat production through biomass combustion. While this opportunity creates hope for advancing progress in closing the infrastructure gap, the investment needs are huge, estimated at about \$75.5 billion per year for the next ten years⁵³. These needs coupled with the high risk of investment and operation complicates the situation further.

Challenges of improving energy access in the agro-industry sector

Insufficient energy generation and poor distribution in Africa is attributable to policy and regulatory barriers, resource limitations and financing as well as to exogenous factors. These constraints have been discussed extensively in the literature (Bhattacharyya 2006; Karekezi & Kithyoma 2003; Munasinghe 1988; Sinha *et al.* 1994; Urban *et al.* 2007). Four main constraints are assessed in the context of their impact on agribusiness development.

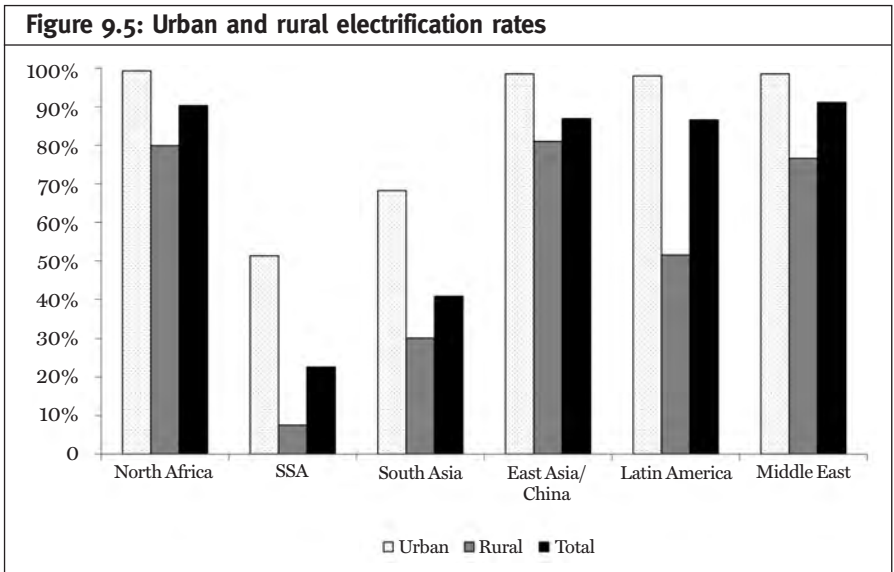
Dispersed energy demand points

High population densities in urban areas lead to a concentrated demand for energy and the opportunity to exploit economies of scale. The majority of Africa's population resides and obtains their livelihoods in rural areas that house agriculture and agro-industrial processes, ranging from preservation (sun-drying or cooling) to energy intensive operations, including pulping, tanning, canning and saw milling. Access to modern energy however, is either extremely limited, too expensive or of low quality in rural areas. Electrification rates show that Africa has lower energy penetration than other regions (Figure 9.5). Urban areas have electrification rates of just above 50 per cent, while in rural areas the rate is extremely low at 10 per cent (IEA 2002).

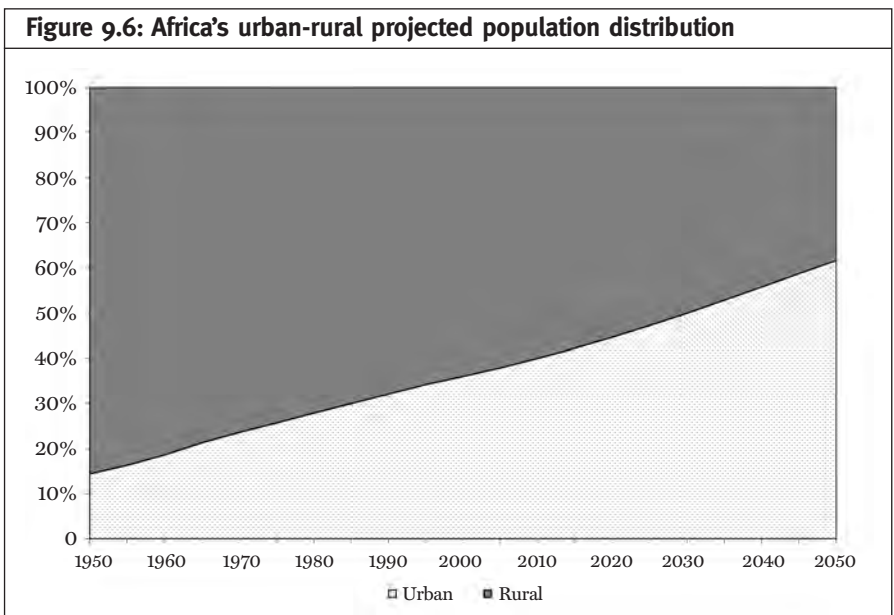
Such low electrification constrain both agro-industrial production and the consumption of processed food products, since many agricultural raw materials,

52. Data source combines energy use in agriculture and forestry.

53. Africa Infrastructure Country Diagnostic study (Foster & Briceño-Garmendia 2010), which covered Benin, Burkina Faso, Cape Verde, Cameroon, Chad, D.R. Congo, Cote d'Ivoire, Ethiopia, Ghana, Kenya, Madagascar, Malawi, Mali, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, South Africa, Sudan, U.R.Tanzania, Uganda and Zambia.



Source: UNIDO with data from IEA (2002)



Source: UNIDO with data from UN-DESA (2008)

especially highly perishable food raw materials, need to be processed within a few hours of harvesting in order to ensure food conservation, food safety and marketability.

The dispersal of energy demand in rural areas also poses a unique challenge in view of the distribution and maintenance costs. This calls for a renewed approach

to energy supply planning in Africa. While 77 per cent of the French population and 81 per cent of the Koreans live in urban areas, only 18 per cent of the Burkina Faso population is urbanized while the rate in the United Republic of Tanzania is 24 per cent (UN-DESA 2008).

While the need for increasing energy access is clear, developing countries must choose whether to prioritize rural areas, where the majority currently resides, or urban areas that will become the homes of the majority of future populations (Figure 9.6). This is a critical consideration, especially given the reality of limited resources and competing urgent basic needs - food security, health and education.

Inappropriate policies

Until recently, many government agencies in Africa viewed improving energy access in rural areas as being synonymous with connecting to the national electricity grid. Rural electrification therefore was simply an attempt to geographically extend the grid to all corners of the country. Experience has now shown that this is very expensive and generally inefficient for meeting immediate and medium-term energy needs (Bhattacharyya 2006). In addition the presence of the grid does not always translate into energy access, especially for the poor who cannot afford either to connect or purchase equipments that utilize the electricity. It is not uncommon to find informal settlement across Africa surrounded by electricity lines or communities adjacent to power generation station without access. This is mainly due to the low penetration of electricity in the energy mix of the poor (Bhattacharyya 2006).

China, a country where half of the population was rated as poor, achieved a 98 per cent electrification rate (IEA 2002), while Tunisia's electrification rate grew spectacularly from six per cent in 1976 to 88 per cent in 2001 (Modi *et al.* 2005), illustrating how effective energy policies can transform societies. However urbanization is an important explanatory factor with a 41 per cent urbanization rate in China while Tunisia's stands at 65 per cent (UN-DESA 2008). From 1949 to 1977 China established a comprehensive rural electrification system with very strong central planning (Peng & Pan 2006). Country level governments were instrumental as the implementation units. Whether these successes can be replicated in other developing countries will depend on a variety of factors, but these two experiences show what can be achieved.

Universal access to grid-based electricity should however remain the long-term goal of any nation. Rural electrification policy is changing as more governments consider stand-alone off-grid systems and other forms of decentralized energy supply. Development assistance efforts have also played a role in contributing to this situation. Official development assistance for energy development in Africa totaled \$87 billion between 1970 and 2005 (OECD 2009d), part of which was focused on introducing new technologies like biogas, wind turbines, solar heaters and solar stoves. Many of these projects did not adequately meet energy requirements, due to insufficient sustainable financing, equipment maintenance problems, mismatched needs and poor technical performance (Gullberg *et al.* 2005; Martinot *et al.* 2002). A few, like the introduction of energy efficient cooking stoves in East Africa are notable exceptions (Karekezi & Kithyoma 2003; Okello 2006).

Financing constraints

At the national level, financing is often problematic especially for large hydro-electric dam projects. Notable examples include Bujagali hydroelectric project in Uganda, Gilgel Gibe III in Ethiopia and the Grand Inga in the Democratic Republic of Congo. Grand Inga, which has an estimated potential of 39000 MW (sufficient to meet the entire continent's current demand), is estimated to cost between \$30 and \$70 billion (World Energy Council 2007), which dwarfs the host country (Democratic Republic of Congo) GDP of some \$12 billion (IMF 2009). Finance is not the only constraint—others include expected environmental impacts, political stability and demand-side management. The AfDB estimates that Africa needs \$547 billion to attain universal electric power by 2030 (Table 9.2). Whether this amount of financing is realistically attainable in the immediate term is debatable, but it remains indicative of the enormity of the challenge.

	Total Capital Investment (\$ Billions)			
	Generation	Transmission	Distribution	Total
Northern Africa	82	29	62	173
South Africa	77	5	10	92
Sub-Saharan Africa	102	54	119	275
Island States	4	1	2	7
Africa	265	89	194	547

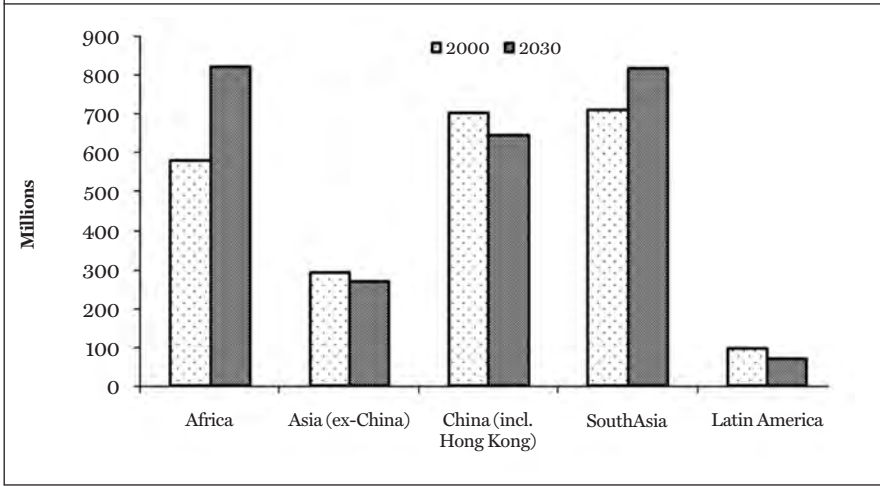
Source: AfDB (2008)

Past, current and near-term energy dependency

A distinction is made between modern biomass converted into energy carriers like electricity, liquid and gaseous fuels and traditional biomass used directly for cooking and heating (Kantha *et al.* 2005). As shown in Figure 9.7 traditional biomass is projected to be the main source of energy in Africa for several years to come. Simplistic measures of energy access like grid-based electrification rates or number of energy equipment disseminated, solar homes systems or biogas plants understate energy supply by ignoring this important source of energy.

Tracking energy flows in the use of traditional biomass is a complex undertaking, and one that raises more questions than answers, but its importance on the continent cannot be overstated. Biomass is preferred, because it is readily available often at no cost or affordable when sold, and can be utilized by simple appliances like cook stoves and kilns. With half the population of SSA living on less than \$1.25 a day (United Nations 2009), subsistence users will continue to be heavily reliant on this energy source. However, the quality of energy from traditional biomass is low, relative to other modern forms of energy that are transmittable and compatible with several agro-industrial applications.

Figure 9.7: Current and projected number of people relying on biomass⁵⁴



Source: UNIDO with data from IEA (2002)

Addressing the challenges of energy access

Redefining rural electrification

Although there seems to be a gradual shift, the conventional wisdom focuses on electrification models with a central supply system and electric power as the final output at the point of consumption. This approach may adequately serve large-scale electricity consumers, but has two main weaknesses at the medium to small-scale level. First, a centralized approach will usually give preference to areas of high energy demand like urban areas, due to inherent technical advantages and economies of scale. Second, electricity as an output requires another tier of applications to convert it to any meaningful use. The cost of acquiring these electrical applications can be prohibitive especially at the small-scale level. Consumer demand is for energy services and not the energy *per se*.

In the context of agro-industrial growth energy access must focus on innovative technologies designed to satisfy demand on the ground. Projects like the Fruits of the Nile (Box 9.1) could be incorporated into national and regional energy planning, as investment costs are extremely low relative to the economic benefits they generate, which are almost immediate.

Box 9.2: Solar drying business links producers with export markets in Uganda

Fruits of the Nile is a Ugandan dried fruit company. It buys fruits from 120 registered primary producer groups, which purchase produce from 840 approved farmers in Southern Uganda. Most producers use the abundantly available solar energy to dry their fruits. Simple timber-framed box driers covered with UV (Ultra Violet) stabilized polyethylene with meshed vents at the base and top

54. Uses are for cooking and heating.

constitute this innovative technology. Each drier box is 4 m long, 1.5 m wide and 0.5 m high and can produce between 5 and 12 kilograms of dried fruit every 2 days depending on availability of sunshine. Heat from the sun raises the temperature of the ambient air inside the box to about 50°C drying the moisture in the fruit. The fruit is dried, packed and transported to the company's factory in Njeru, where 37 people are employed. Sorting and repacking is done at the factory.

Primary producers earn about Uganda Shillings (UGS) 3.8 million (£1,100) per year and employ extra hands to assist. Each drier costs £150 which the farmers can obtain in form of a loan from the Company. Accounting for labour costs, driers and transportation, the producers keep about 50 per cent of their earnings. Overall about 1,400 people receive some income from the work of the Fruits of the Nile company and at least 8,000 family members benefit.

Source: Ashden Awards for Sustainable Energy (2008)

Incorporating decentralized energy distribution approaches

Creating energy supply points in remote rural areas that provide the needed energy services has the potential to encourage small and medium-scale processing and production. Although small-scale decentralized energy is not the ultimate solution to the energy needs of the agro-industrial sector, its role is crucial and must be incorporated in energy planning at all levels. Advantages of a decentralized system include the following:

- Lower capital costs per unit of energy in the short term.
- Ease of matching technology with energy needs.
- Utilization of local energy resources.
- Operations and maintenance done at the local level.

An example of such an approach is the multifunctional platform project in Mali implemented with assistance from the United Nations Development Programme (UNDP) (Box 9.3).

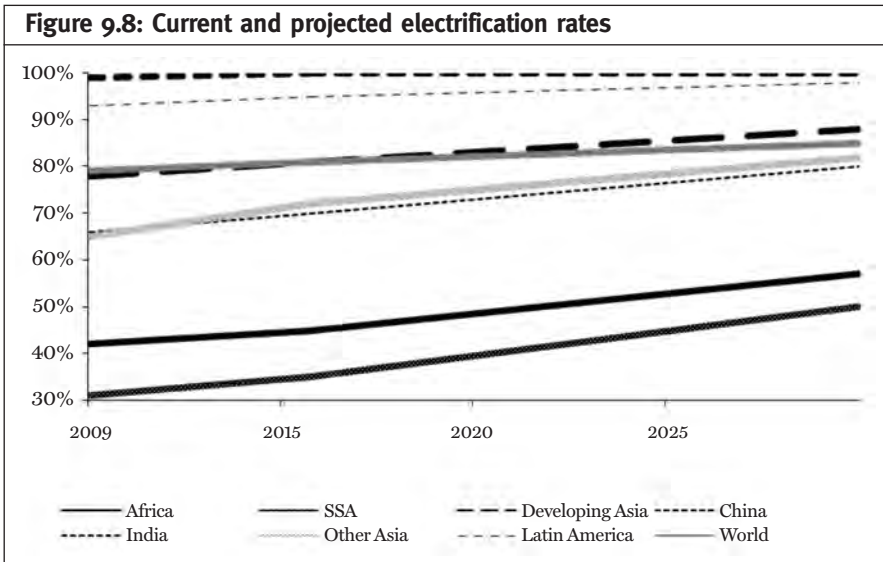
Box 9.3: Multifunctional platform (MFP) in Mali

Rural villages in Mali tend to be small and dispersed with very few pockets having access to grid-based electricity. In 1993, the UNIDO and the International Fund for Agricultural Development (IFAD) initiated a programme aimed at supplying energy services to women through isolated but integrated energy supply points known as Multifunctional Platforms (MFP). These provide various energy services, including mechanical power for agro-processing (milling and dehusking), electric power for welding and pumping water. The MFP is a 10 horsepower diesel engine generating energy that can power several services. In 1998, the government of Mali and UNDP moved to install nearly 500 MFPs reaching an estimated 100,000 rural women in villages. This fact alone highlights the efficiency of isolated systems and ability to reach more people compared to grid extensions, which may be preferred but would cost far much more. While this model faces many challenges, including installation capital, maintenance, local coordination and long-term sustainability, it demonstrates the merits of this approach.

Source: Brew-Hammond & Crole-Rees (2004)

Improving locally available energy supply resources

Over 500 million people on the continent, mostly in rural areas, live without electricity, while access to electricity is projected to remain below 50 per cent for sub-Saharan Africa as far ahead as 2030 (Figure 9.8 and IEA (2002; 2010b)). While scaling up efforts to move towards modern energy, ways to improve existing indigenous energy supply systems should also be considered. Sustainable use should be addressed on the demand-side – the introduction of short rotation crops and improved harvesting methods. Greater demand-side efficiency and the reduction of health hazards remain key, as well as the use of simple additions, like exhaust chimneys that would improve the quality of energy supply.



Source: UNIDO with data from the IEA (2010a)

As societies advance in socio-economic status, they tend to abandon traditional energy types for more modern forms (Davis 1998; Hosier & Dowd 1987; Leach 1992; World Bank 1996). More recently however, the energy matrix concept has gained traction. This suggests that as households progress they do not necessarily switch to other forms of energy but rather use a mix of sources (Campbell *et al.* 2003; Masera & Omar 2000). The implication is that policy should focus on widening energy choice rather than developing new energy sources and abandoning existing ones.

Africa has great potential both to expand existing energy supply while simultaneously developing new options. The hydroelectricity generation potential of the continent remains largely untapped, as is also the case for solar and geothermal energy sources. Large hydroelectric power projects have had bad press of late, in part due to social and environmental costs. As the debate over new hydropower projects continues, the continent lags behind with only about 1,500 hydroelectric dams out of the world total of 45,000 (Workman 2001). Moreover, climate change

threatens to affect Africa's hydroelectric potential and account will have to be taken of its potential impact on rainfall patterns across the continent. While overall hydropower capacity may well be reduced to some degree by climate change, it is inconceivable that it will be totally eliminated. A good example is the Congo River, which is estimated to have the capacity to generate 40,000 megawatts (MW) but currently utilizes only a small fraction of this. Other projects in the pipeline include the Gilgel Gibe III, with estimated output of 1870 MW in Ethiopia, the 400 MW project in Gui in Ghana, 250 MW Bujagali hydro project in Uganda and the 2100 MW Mambilla plateau hydro scheme in Nigeria.

Matching energy technologies with needs

The design of energy systems for the agro-industrial sector should be driven by needs—the most important of which are electricity for heating, cooling and mechanical services. The basis of the plan should be aimed at meeting a need and not simply supplying energy, as the latter does not guarantee that the needs will be met.

Energy needs in the agro-industry sector vary in terms of power required, seasonality and applicable technology. In the context of limited resources, providing wholesale power, where power is generally available through a grid connection without the end user in mind, often leads to underutilization of resources. Table 9.3 gives examples of different agro-industrial energy needs and appropriate technologies with which they should be matched.

Table 9.3: Examples of small-scale productive application of alternative energy technologies		
Productive application	Typical Peak Power required	Technology
Water pumping (fish farming)	0.5 – 3 kW	PV, wind-electric
Corn and Wheat grinding, Milling paddy	0.5 – 3 kW	Wind, PV/Diesel hybrid, micro hydro
Refrigeration (Dairy products, fish, meat)	0.5 – 10 + kW	PV, wind-electric, micro hydro
Micro-irrigation	1 – 3 kW	PV, wind-electric, micro hydro
Ice making	2 -10 kW	Wind-electric, micro hydro

Source: Adapted from World Bank (2008b)

Financing energy services

The type of energy services required and the scale of demand will determine the most appropriate form of financing. Traditional forms of finance for large-scale projects include public finance (international or national), private-public partnerships, concessional and non-concessional loans (see also chapter 7). Public-private ventures are increasingly being seen as vehicles of financing energy production initiatives, and should thus be considered where applicable. In addition, financing

suitability of projects is boosted when the energy project is aimed at productive uses that generate incomes, as is the case of agro-industrial processes.

Carbon finance is an emerging source of financing that is gaining recognition in developing countries, suitable for agro-industrial infrastructure investment, such as the Clean Development Mechanism (CDM) (see chapter 7). This mechanism aims at reducing GHG emissions, while at the same time providing funds for development in developing countries.

Private sector investors can play a significant role in availing financing and technical expertise in the energy sector. Policies that are conducive to private investments are a prerequisite for this. New ways of structuring the industry have emerged in Africa since the 1990s in a move away from the state-owned energy monopolies. Some African countries have adopted policies to unbundle and privatize their power sector to introduce the much needed competition. Private sector participation can also be through management contracts, concessions and joint private-public ventures. Several examples abound in sub-Saharan Africa.

The Small Hydro for Greening the Tea industry in Eastern and Southern Africa Project (by UNEP, Division of Global Environment Facility Coordination, the AfDB, the East African Tea Trade Association and the Energy, Environment and Development Network for Africa) is expected to directly or indirectly benefit over eight million people, including tea farmers, workers, and their dependents in Eastern and Southern Africa through the installation of small hydroelectricity generation stations in the region's tea industry. In addition to reducing GHG emissions, the small hydropower installations will reduce the tea industry's energy costs, enhance global competitiveness of the region's tea industry and increase the share of global tea revenues flowing to the region's tea farming community. Also, the Cogeneration for Africa, an innovative and first of its kind clean energy regional initiative funded by Global Environment Facility, is building on the success of cogeneration in Mauritius, which currently meets close to 40 per cent of the country's electricity needs. It seeks to significantly scale up the use of efficient cogeneration systems initially in seven Eastern and Southern African countries (Kenya, Ethiopia, Malawi, Sudan, Uganda, the United Republic of Tanzania and Swaziland). The Cogeneration for Africa project is working with promising and profitable agro-industries, which have a solid track record and have demonstrated commitment to expanding their cogeneration investments in Africa. Key agro-industries actively participating in the project include privately owned and profitable sugar companies, as well as private sector entities involved in agro-processing industries, such as pulp and paper, forest products, palm oil, ground nuts, sisal and rice.

Water Resources

With about 15 per cent of the world's population, Africa has only about 9 per cent of the world's internally renewable water resources (FAO 2010d). This translates to only about 4,600 m³ of water *per capita* per annum, compared to about 26,700 m³ in Latin America or 9,100 m³ in Europe underscoring the relevance of improved water resource management (Kamara 2009). So far, only about 63 per cent of the continent's population has access to improved water sources for basic needs,

compared to 91 per cent and 87 per cent for Latin America and East Asia, including the Pacific, respectively (FAO 2010d). While this does not include exact quantities of water users in the agro-industrial sector, it serves as an indicator of the disparities across these regions.

Water resources in the region are unevenly distributed with the West and Central regions being relatively abundant in water, while the North and parts of the South water is relatively scarce. Even more challenging is the temporal distribution, which subjects the continent to periods of extreme floods and droughts with high social and economic costs. This is projected to be exacerbated further by climate change and variability. Water availability goes beyond the existence of natural water resources as other regions, even naturally water deprived areas such as the Middle East have managed to secure higher access than most countries in Africa. This difference is summarized by robust water infrastructure systems that boost collection, storage, treatment (refinement or desalination), distribution and disposal (or recycling).

The recent escalation of food prices in 2007/8 was a litmus test for the continent's high vulnerability to food-related shocks (Kamara *et al.* 2009). With Africa's current emphasis on economic diversification to reduce this vulnerability, investment in agro-industry is crucial to ensure food security. Without adequate access to reliable water supplies, food self-sufficiency will remain a distant dream in Africa.

Obtaining up to date and disaggregated information is extremely difficult and limited largely to the amounts used in the industrial sector. Data from the FAO show that water withdrawal by industry stagnated at 9 km³ from 1994 to 2004. Of this total withdrawn water, industry used only 4 per cent in 2004, down from 6 per cent in 1994. In contrast, the share of agricultural and domestic use marginally increased by 1 per cent each from 85 per cent and 9 per cent in 1994 to 86 per cent and 10 per cent in 2004, respectively (FAO 2005).

A number of studies have examined water use at the farm level, but water use by food processing firms has received relatively little attention, despite the importance of water in food processing (Dupont & Renzetti 1998). Nevertheless, some studies have provided valuable insights that convey anecdotal information on the agro-industrial water use. Mannapperuma *et al.* (1993) surveyed 71 food-processing plants across food-processing subsectors (comprising fruit and vegetable, wine and beverages, seafood, meat, dairy, and oils) in California, U.S. Their results show that the quantity and cost of fresh water supply and wastewater disposal, including the dynamics of access are so significant as to deserve high attention for successful agro-industrial development. The same applies to leather and tanning processes involving high intensity in water use.

With the exception of North Africa and parts of Southern Africa, lack of access to water is largely due to economic scarcity. Improved management and increased investment is needed to capture, store and deliver water. In contrast, physical scarcity exists where most or all the water resources have already been exploited through the construction of dams, and diversion and delivery structures (Seckler *et al.* 1998; Kamara & Sally 2004). In other words, water scarcity is not inevitable, but can be addressed through adequate intervention. Economic water scarcity has

implications on planning and prioritizing water-related investment in various sectors, and for improving management to increase temporal availability and minimize shocks.

There are many assessments of the region's water potential. According to the FAO, the irrigation potential of the continent is estimated at more than 42.5 million hectares—about 20 per cent of the total area in Africa that is currently under cultivation (FAO 2005). The Africa Infrastructure Country Diagnostic study (Foster & Briceño-Garmendia 2010) estimates that, focusing on measuring the area that is economically viable for irrigation, the irrigated area can be increased fourfold through both large-scale (large dams, distribution canals and on-farm systems) and small-scale (soil-moisture management, supplementary irrigation, and rainwater harvesting, or small reservoirs) developments, at a cost of more than \$35 billion (You 2008).

Without irrigation, reliance on rain-fed agriculture creates uncertainty in the time, quantity and quality of expected produce for processing. Irrigation ensures stability, providing the opportunity for all year round harvesting, estimating expected production and predicting harvesting seasons. Box 9.4 shows the importance of water-related infrastructure in connection with climate change (chapter 3).

Box 9.4: Impact of climate change on water supply

In the wake of global climate variability, water-related infrastructure becomes all the more critical to ensure the increase of water availability. Climate change will have a large impact on water supply system, altering rainfall patterns and therefore reservoir storage, and in turn, affecting the availability of water for agricultural and industrial use. Many semi-arid and arid areas, including southern Africa are particularly exposed to the adverse impacts of climate changes and are projected to suffer a decrease in water resources. Climate change also affects the function and operation of existing water infrastructure (hydropower, structural flood defenses, drainage, and irrigation systems), as well as water management practices, particularly on the continent, aggravating the impacts of other stresses, such as population growth, industrialization and urbanization.

Source: Bates *et al.* (2008)

Cold Storage and Warehousing Infrastructure

Cold storage and warehousing infrastructure are related to the issue of transportation and electricity for agribusiness purposes in sub-Saharan Africa. The establishment of such infrastructure, which may include cooling and storage facilities, warehouses and marketing structures, is essential for logistics and supply chain management in the growth of agro-processing industries. Selected post-harvest facilities like refrigeration stores and drying facilities, on the continent are crucial to the quality and timely delivery of raw materials and products, but remain inadequate. In many countries, the private sector has taken up the challenge of providing such storage, warehousing and logistic services for a fee, but they are not usually adequate. Improvements in storage and warehousing infrastructure would considerably reduce transaction costs, increase efficiency and improve the competitiveness of agro-processing firms and producers.

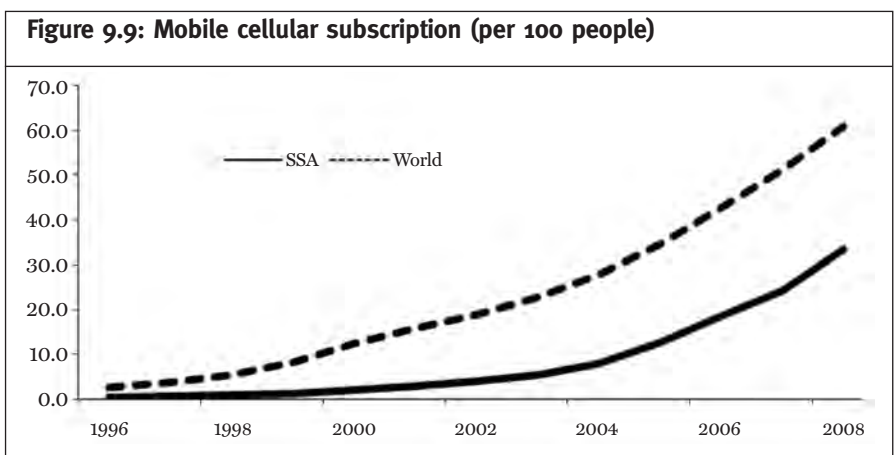
Cold storage and warehousing constraints severely limit the capacity of African producers to penetrate global value chains. Uganda is one of the top producers of bananas in the world, yet it does not feature prominently on the list of leading banana exporters, largely due to the lack of adequate cold storage and processing facilities for the perishable fruit, as well as transportation infrastructure limitations that reduce inventory turnover. The limited investment in cold chain systems and processing facilities means that most of the income from African bananas today is confined to sales of fresh, perishable fruit for immediate consumption, jeopardizing the opportunities to expand income for banana farmers.

Other important areas that fresh produce companies and African governments need to intervene in include substantial investments in supply control and traceability systems, upgrading of packinghouse facilities (such as improved water and sanitation and advanced cold treatment and storage systems), staff training and health counseling, and environmental testing to enable them to service the demand for premium-quality products such as salads and other semi-prepared vegetable products, particularly in the UK.

Information, communication and technology (ICT)

ICT is used as an umbrella term for communication devices or applications - mobile phones, satellite systems, computers and computer networks, including associated services. While radio and television can be considered as part of ICT infrastructure, they are not included in this discussion. ICT has often been misconstrued as a tertiary need among developing populations, because of the sophisticated innovation and technology that come with it. This argument stems from the reality that developing countries have increasing and complicated needs but very limited resources, and therefore prudent investment dictates a focus on the basics of social and economic well-being.

In the last 15 years however, the mobile phone revolution in developing countries has challenged this notion. Growth in the number of mobile users and mobile



Source: UNIDO with data from the World Bank (2010b)

applications across Africa has been impressive and continues to be the fastest growing subsectors on the continent, albeit from a low base. Africa is the fastest growing mobile phone market in the world, representing 10 per cent of the total connections worldwide (15 per cent of the world's population lives on the continent) (Figure 9.9). Connections are expected to top 450 million by the end of 2009.

Current internet prices in sub-Saharan Africa are the highest in the world. There are several explanations for this, although the use of the Very Small Aperture Terminals (VSAT) earth stations contributes significantly to this high cost. The International Telecommunication Union (ITU) and the World Bank estimate the average price of broadband to be \$110 for 100 kilobits per second (kbps) in SSA compared to the \$30 in Middle East and North Africa. The cost in Europe and Central Asia is lower at \$20 and even lower in Latin America and the Caribbean at \$7. This high cost has been one of the major constraints limiting penetration and wide use.

Roycroft & Anantho (2003) explain that African nations have been facing a dual digital divide. On the one hand a majority of the population lacks basic infrastructure for Internet access while on the other, the few that have access cannot maximize the benefit due to the low quality of service and capacity as well as the high cost. Recent developments indicate that this is quickly changing as more countries in Africa are routing their communication through the more reliable undersea fiber optic cables (Figure 9.10). This development offers great possibilities, opening new frontiers for agro-industrial investment in Africa. Bandwidth prices are expected to fall dramatically while the quality of connectivity will improve and the enhanced speeds will reduce limitations on the use of multimedia and communication applications like video conferencing.

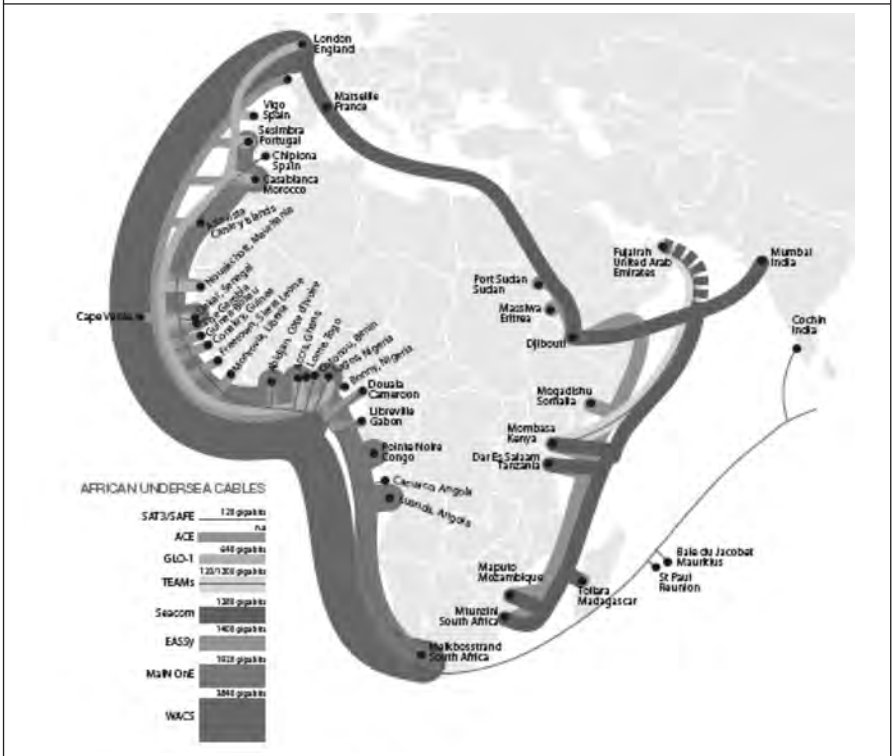
The current and potential roles of ICTs in the agro-industrial sector in Africa (especially IT through phone calls, SMS, web sites, emails and other forms of Internet communication) can be broadly classified (Roepstorff & Yumkella 2004).

Access to knowledge, technology and innovation: agro-industrial enterprises can gain access to knowledge about existing technologies, best practice technology and innovation through online sites on new scientific research findings worldwide. Information can also be accessed on know-how, suppliers, competitors and markets.

New management and organizational systems: massive information flows compel agro-industrial enterprises not only to introduce or improve the use of ICTs, but also to introduce better information management systems. Many ICT applications are vital for improving enterprise managerial efficiency and productivity through efficient information management systems in such areas as lean management, production planning, work methods, plant layout, process control, just-in-time systems, as well as more advanced management systems such as computer-aided design (CAD), computer-aided manufacturing (CAM), and flexible manufacturing systems.

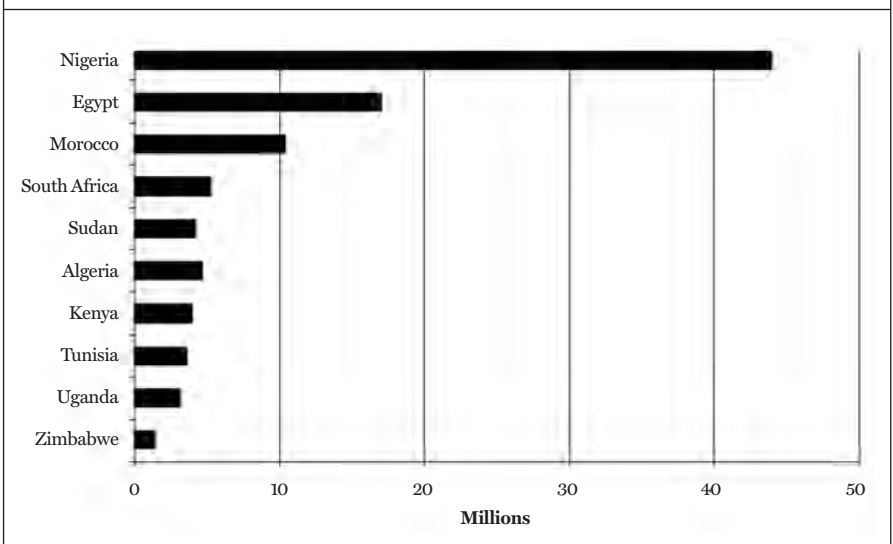
Access to markets and global value chain: the Internet offers accurate, timely and pertinent information on raw material supply and prices and market information, in particular export markets, either as a direct trading channel, such as electronic commerce, or through tender for contracts for outsourcing. Tendering for

Figure 9.10: Africa undersea cables



Source: AfDB & OECD (2009)

Figure 9.11: Top ten Internet user countries in Africa



Source: Miniwatts Marketing Group (2010)

value chain contracts through the Internet is essential; companies must know that opportunities exist, as soon as they are announced through the Internet, to have a reasonable chance of responding in time and winning a contract. There are many advantages with electronic commerce, which offers faster, more efficient and potentially more cost-effective ways of connecting with a network of enterprises in the value chain. Efficiency gains through e-commerce and information dissemination include *inter alia* cheaper and faster procurement, smaller inventories, and lower advertising and communication costs, lower sales costs, cheaper customer support and better knowledge and forecast of consumer demand.

The use of ICTs is a precondition for participating in value chains. Global production systems have become more efficient due to the use of IT in manufacturing, management and marketing. Interaction, networking and communication between farmers, producers, suppliers, buyers, distributors and other stakeholders in value chains via the Internet can facilitate better coordination and improve efficiency. Moreover, ICTs can be used as control techniques for customer feedback leading to innovation in manufacturing products and processes. Simultaneously, the entry requirements for participating in global value chains have increased due to the need for information access through the Internet and the associated need for continuously upgrading information infrastructure and capabilities required for connectivity (Gereffi 2001). ICT is also emerging as an innovative and reliable medium for payment transfers in the agro-industrial sector (Box 7.6). In addition, in many parts of Africa, new forms of ICT are being used to improve both overall agricultural and agro-industrial development. These include voice information delivery services; radio dial up (information on demand) and regular radio broadcasts; extension services based on mobile phone and database monitoring; and e-learning for basic skills, agro-industrial education and video based approaches.

9.4. Costs associated with poor infrastructure

Poor infrastructure is one of the factors that weakens competitiveness and makes the African continent one of the most expensive places in the world to produce, despite the continent's inherent natural endowments. According to the World Economic Forum *et al.* (2009), a critical measure of a country's competitiveness is represented by its production cost structure. These costs are of three types; namely, direct costs, indirect costs and invisible costs. Direct costs are those factory floor costs associated with the production process itself such as electricity, labor and capital. Indirect costs are those costs associated with getting what is produced to the market and those associated with the broader business environment in which the firms operate. Examples are transport and regulatory environment. Invisible costs are those losses experienced by firms as a consequence of the poor quality of the business environment. Specifically, we will examine the losses due to poor infrastructure services especially for power interruptions and transport delays. Inadequate transportation and electricity outages increase operating costs, disrupt production and reduce profitability in agro-industrial firms. Eifert *et al.* (2008) have demonstrated that firm performance is sensitive to cost of indirect inputs, and since indirect inputs are not usually included in estimations of value added, exist-

ing cost estimates usually understates the relative performance of agro processing firms in sub-Saharan Africa.

Direct costs associated with poor electricity infrastructure

The Enterprise Study of the World Bank (see World Economic Forum *et al.* (2009)) documents electricity costs for 48 countries out of which 19 of them were in Africa. According to the data, one kilowatt hour (kWh) of electricity for industrial use in Africa costs on average \$0,068. Only in Southeast Asia is electricity costlier, but not in all countries. Africa is not competitive in terms of this key infrastructure cost. Industries in East Asia, pay on average 7 per cent less than industries in Africa for electricity; industries in India and Vietnam pay about 11 per cent less and this is still much less for Brazil. However there is a wide variation within Africa. Electricity costs are as low as \$0.04 in Lesotho and Botswana and as high as \$0.14 in Senegal. Electricity costs are 20 per cent cheaper in oil rich countries and 15 per cent more expensive in landlocked African countries.

Indirect costs associated with transport infrastructure

Transportation costs are an important aspect of the global supply chain. To be competitive, it is essential to be able to move goods within a country cheaply. Africa's geography does not help in this regard. A huge continent with a low ratio of roads per square kilometre and large distances represents a natural obstacle to competitiveness. Furthermore Africa is the continent with the highest number of landlocked countries.

Aryeetey & Nyanteng (2006) estimate that transportation accounts for about 70 per cent of total marketing costs in Ghana. In Zambia, it is estimated that because of the poor state of roads and railways transport costs can be as high as 17 per cent of the total value of exports (Chiwele 2008). Thus, Africa's freight costs in relation to total value of imports were around 13 per cent in 2000, compared with 8.8 per cent for all developing countries and 5.2 per cent for developed countries, with the highest costs prevailing in East and Southern Africa (UNECA *et al.* 2010). Transport costs account for 15 per cent of the unit value of exports in Africa compared with around 8 per cent in Asia and 5 per cent in Western Europe (Ackah 2005).

Inland transportation costs are higher in Africa than in other regions of the world. It costs \$1,100 on average to ship a typical container with imports inland; it costs \$872 for exports. This is higher than all other regions except Eastern Europe and Central Asia where it costs \$1,141 and \$989, respectively. East Asia, South Asia, and Latin America and the Caribbean on the other hand enjoy a significant comparative advantage with respect to transport costs. In addition, being a landlocked country obviously adds to the transportation cost especially in sub-Saharan Africa. African countries pay close to one third more in inland transportation costs than landlocked countries outside Africa (\$2,200 versus \$1,500). Research undertaken by Limao & Venables (2001) suggests that the elasticity of trade flows in relation to transport costs is minus three which is consistent with research by Longo & Sekkat (2001) showing that a one per cent increase in the stock of transportation and

telecommunication infrastructure would result in an intra-African export growth of around 3 per cent. Limao & Venables (2001) estimate that the median transport costs for an LLC are approximately 46 per cent higher than the equivalent costs of a median coastal economy. Road infrastructure accounts for 60 per cent of transport costs in LLCs, but only 40 per cent in coastal economies. These are significant costs that penalize agro-industries and firms on the continent.

Another important aspect of transport costs is represented by port and terminal handling fees. This is particularly important for export oriented agro-industries. These costs vary widely around the world, ranging from as low as \$50 to as high as \$1,000 per container. Africa displays the highest variation across countries and remains the region with the highest average cost for both import and export handling fees. These inadequacies translate not only to lowered operational efficiencies and competitiveness but also high transaction costs.

Invisible costs associated with unreliable electricity and transport infrastructure

For specific reasons, such as strong economic growth in some African countries, economic collapse in others, war, poor planning, population booms, high oil prices and drought, sub-Saharan African countries face crippling electricity shortages. Agro-industries and other types of firms around the world experience power outages that last from a few minutes to hours. Africa holds the unenviable record of being one of the best places, experiencing the longest outages. In some countries on the continent, power losses last approximately 12 hours. As a consequence, agro-industries and other firms in Africa lose power on the average for 13 per cent of their working hours. This is much higher than in all other regions. In East Asia firms lose power for only 1 per cent of their working hours. South Asia is the region closest to Africa and yet firms there lose power of only 7 per cent of the working hours.

Unreliable power has severe cost implications for agro industries and other firms. They will either lose sales or they have to buy generators. As a matter of fact many firms purchase generators. After South Asia, where 50 per cent of the firms have generators, Africa has the highest share of firms. In East Asia, only 30 per cent of the firms do. A much larger share of the exporters in Africa own generators—60 per cent, at par with South Asia and much more than East Asia exporters, where it is 38 per cent. Generators are expensive with prices that range from a couple of thousand dollars to almost a million, depending on capacity. Consequently, not all firms can afford to buy generators. Agro-industrial firms therefore experience two types of losses associated with power disruptions: one is the actual loss in sales for those firms that do not have a generator, and the second is the financing cost of buying a generator for those that own one. The losses sustained by those firms that do not own a generator are higher than the cost of financing a generator. Further, the average loss, due to power outages for firms in Africa, is the second highest of all regions after South Asia. On the continent, firms lose almost \$9,000 a year because of power unreliability.

The inefficiency of the transport system can add to production costs in subtle ways, such as by requiring firms to hold higher inventories than they would other-

wise. If the delivery time of inputs is uncertain, firms will have to order inputs ahead of what would otherwise be the optimal time. This implies an additional cost represented by holding unwanted fixed investments for an extra period of time. If firms adjust their inventory stock according to the efficiency of the transport system, we can estimate the cost of borrowing the necessary funds to purchase such inventories. By doing so, we see that firms in Africa lose some \$850 a year in additional interest paid solely to buy inventories in advance. This amount is similar to what firms in Latin America and the Caribbean pay, and less than what is paid by firms in South Asia and in Eastern Europe and Central Asia. This estimated loss is 40 per cent higher for African firms than for those in East Asia.

9.5. Conclusions

The existence of a reliable and appropriate infrastructural system is an essential enabler for any meaningful agro-industrial development. Infrastructure weaknesses lead to slower economic growth, higher transaction costs and insecurity, while impeding innovation, diversification and competitiveness. LLCs, in particular, are most seriously affected by their geographical isolation and associated transport constraints. In this situation, even marginal changes in infrastructural services have the potential to significantly accelerate productivity and diversification.

Transport infrastructure investment –covering road, rail, air and sea transport - needs to be strategic and avoid sporadic implementation, which is often driven by external interests. Africa's uniqueness should offer guidance on the appropriate methods of deploying infrastructural services. These infrastructural investments should be built upon each other through systematic integration of operational systems, countries and legal frameworks.

In the area of ICT, Africa has made commendable progress especially in the use of mobile phone services. Even though ICT provides channels for information sharing and communication, which open up new frontiers for trade and collaboration, its application and use in agro-processing remains limited. The potential for growth needs to be fully utilized to ensure expansion, especially in rural and remote locations on the continent. This will not only improve efficiency and raise productivity, but will ensure that producers are intimately connected to key actors in the value chain and processes, while timely access to price information will increase their bargaining power, raise profit and increase production volumes to allow processing plants to operate in full capacity.

Access to water and water-related infrastructure is critical both for realizing the full potential of agricultural production and for ensuring the emergence of a vibrant agro-industrial sector. Besides its indispensable role in agro-processing, water supply improves the predictability of quantity of agricultural products through increased and secured harvest, which provides incentives for agro-industrial investors with long-term interests. With increasing climatic variability, the need to wean off rain-fed agriculture is even more urgent today. This is especially so given the vast diversity of crops that rely on rain-fed agriculture and the huge potential for such crops to feed emerging agro-industries and reduce seasonal fluctuations in Africa's food availability through processing, value addition and preservation.

Within the daunting challenge of improving infrastructure in Africa lie great opportunities that must be recognized. There is an urgent need for accelerating intra- African cooperation in enhancing the region's infrastructure especially at the subregional level. In this context, special priority could be assigned to completing transport corridors, especially for LLCs, and locating new programmes for agro-industrial development in such corridors. The rapid population growth on the continent and the potential for sustained economic growth, evidenced by Africa's excellent pre-crisis growth record, creates an opportunity for a dynamic and more vibrant agro-industrial sector. It is therefore critical that infrastructure investment be made while taking advantage of this potential increase in demand for food and changing demand patterns that accompany economic growth. The growth, especially among the emerging middle class, could result in permanent shifts in the continent's consumption patterns, which could increasingly favour processed agricultural products.

Also imperative is clean, affordable and reliable energy appropriately matched to provide relevant energy services within the agro-industrial sector. Delivering pertinent energy services, as opposed to simply improving energy access should be the guiding goal of any development intervention. This distinction is critical and plays an important role when matching the utilities of energy with developmental needs in any sector, including agro-industry.

In the context of agro-industrial growth strategies for energy, access could focus on incorporating decentralized energy distribution approaches and redefining rural electrification through innovative technologies, designed to satisfy demand on the ground (similar to projects like the Fruit of the Nile), and incorporate these into national and energy planning. Policy could focus on improving locally available energy supply resources and widening the energy choice; the hydroelectricity generation potential remains largely untapped (although climate change threatens to affect Africa's potential). This also applies to solar and geothermal energy sources.

With regard to financing, public-private ventures are increasingly being seen as vehicles of financing energy production. Private sector investors and privatization can play a significant role in helping the energy sector benefit from financing and technical expertise. In terms of carbon financing the Clean Development Mechanism (CDM) is one of three ways under the Kyoto Protocol in which developed countries can reduce their GHG emissions, where developed countries invest in projects implemented in developing countries which reduce GHG including energy projects. This financing source is yet to adequately tapped by Africa, which currently only holds two per cent of the number of projects under CDM worldwide for a total world market of \$64 billion in 2007. Carbon finances are monetary resources generated from carbon markets with the overall goal of providing cost-effective measures to reduce GHG emissions, which are the main drivers of climate change.

There are opportunities for attracting and leveraging investment, for instance emerging forms of project financing, including carbon finance (suitable especially for the energy sector), climate change adaptation funds, microcredit facilities, public-private partnerships ventures and bilateral project investments. A recent example is China's growing participation in sub-Saharan African infrastructure

investment, especially projects related to natural resources. The bottom line for improving infrastructural services in Africa is enhanced service delivery capacity, improving operations and maintenance, while upgrading existing infrastructure. This quest comes with a triple beneficial effect: improved infrastructure base, increased foreign and local investment and employment creation.

Part C: An agenda for action

10. The new policy space

Torben M. Roepstorff, Anthony M. Hawkins, Dirk Willem te Velde and Nicola Cantore

10.1. Introduction

This chapter outlines the new policy context and issues for facilitating private agribusiness development, in terms of transforming agriculture into agricultural industry. It places into context the ongoing policy debate and the rationale, issues and framework for promoting agribusiness development in Africa. This policy framework presents a menu of policy options for supporting private industry in overcoming binding constraints on agribusiness development. The key emphasis of the chapter is on stimulating private agribusiness development through selected policy instruments, strategies and institutional support.

10.2. The rationale for agribusiness development strategy and policies

This book has argued that there is a powerful case for adopting a strategy of agribusiness development rather than an agriculture-led development strategy per se as in the past. African economic growth has in the past been largely driven by commodity exports, especially oil and metals, and in this process SSA has deindustrialized. This is in sharp contrast to the growth pattern of other developing regions, especially Asia, where growth has been driven by manufacturing. The pitfalls of relying on a commodity-driven growth path are manifold and include resource curse risks, secular terms of trade deterioration, Dutch Disease currency overvaluation effects, weak backward and forward linkages to the domestic economy

Table 10.1: The 'new normal' paradigm	
1980-2000⁵⁵ Normal Paradigm	2001-2030 The New Normal Paradigm
OECD economies drive economic growth	Emerging markets drive output growth
Robust global economic growth fuelled by financial globalization – the explosive acceleration of cross-border capital flows	Slower global economic growth in part reflecting weakened financial systems, a reaction against 'excessive' financial deregulation and a more constrained increase in cross-border capital flows.
Capital flows from North to South	Capital flows South to South and South to North
Private capital flows dominate	Sovereign Wealth Funds increase share of cross-border investment
Export-led growth, especially by Asian economies	Demand rebalancing in Asian economies
Limited state intervention in the economy	Growing state intervention
Market capitalism	State capitalism
Deregulation, liberalization and privatization	Industrial policy rejuvenated
Western multinationals drive FDI	Emerging market multinationals, including state-owned enterprises, drive FDI
Factor accumulation drives growth	Total factor productivity drives growth
OECD donors dominate aid flows	OECD aid flows stagnate and eventually decline as new emerging market donors become increasingly influential

and advanced technologies with limited job creation, which all narrow the scope for value addition.

These pitfalls can be avoided by pursuing an agribusiness growth strategy, which suits both the resource endowment of most sub-Saharan African economies and the circumstances in which the overwhelming majority of the poor live in rural areas and potentially depend on agro-industry for their livelihood. Agribusiness is labour-intensive in terms of creating jobs and generating value added in agro-processing activities; moreover, it entails significant forward and backward linkages, which do not exist to the same extent in the extractive industries. At the same time, deep-rooted structural changes are taking place in the global economy, involving shifting wealth (see OECD 2010a) in the so-called 'New Normal' paradigm. Although this term has been applied mainly in economies directly hit by the financial crisis and subsequent recession, it can be applied to sub-Saharan Africa as many

55. Policy reforms of the 1980s and 1990s focussed on the desirability of a few simple reforms, which can be summarized under the triple commandments: stabilize, liberalize and privatize. A wave of policy reforms around the world emerged, which was modelled after the now much-maligned 'Washington Consensus' dating back to 1989 (Rodrik 2004b).

(number of countries in SSA)	1990s total (SSA)	2000s total (SSA)
Affluent	34 (0)	40 (0)
Converging	12 (2)	65 (17)
Struggling	66 (7)	38 (6)
Poor	55 (35)	25 (21)
Total	167	168
SSA	44	44

Source: OECD (2010a)

argue that past development models and experience will apply to Africa some decades later.

Table 10.1 is suggestive, rather than prescriptive, and reflects forecasts that, by 2030, today’s emerging markets will account for around 60 per cent of global GDP, compared with 40 per cent in 1990 (OECD 2010a). Three trends are reflected in the new normal paradigm: a) The centre of economic gravity will continue to shift from OECD economies to emerging markets; b) The state will play a greater role in development; and c) The ‘traditional’ export markets, suppliers, donors and sources of FDI will increasingly shift towards Asia, Latin America and Eastern Europe.

Obviously there is great diversity among different emerging markets, ranging from rapidly growing Asian economies, to African countries, many of which remain mired in extreme poverty. However, as shown in Table 10.2, much progress has been made in sub-Saharan Africa. The number of poor countries has fallen from 35 in the 1990s to 21 in the 2000s, while the number of more developed ‘converging’ countries has increased from 2 to 17. Most countries in this category—12 out of 17—are either oil exporters or mineral exporters, underlining the extent to which sub-Saharan Africa has been commodity driven. Of the remaining five countries, two cannot be classified as resource-based economies leaving just three countries—Ethiopia, Uganda and Rwanda—which have achieved convergence primarily through agricultural development. The circumstance that almost one quarter of the African ‘convergers’ are agricultural-based economies, while all 21 SSA countries classified as poor economies are also agricultural-based, highlights the stark reality that resource-poor economies, especially LDCs, face the risk of being left further behind unless they can more fully exploit their agribusiness potential.

For this reason, this book adopts an entirely different focus from others that have attempted to address Africa’s weak agricultural performance, by focussing on the entire agribusiness value chain and not just on agriculture per se: agricultural development cannot be conceived as a production-led strategy. It is linked to the entire value chain by market demand, which must play the driving force in development. This involves a shift from a supply-driven strategy to a demand-driven one, in which the entire agribusiness value chain—covering agriculture, industry and

services—plays the critical role. By planting agribusiness at the centre of the New Normal global economy, this book seeks to change the fundamental terms of the dialogue. Indeed, an agribusiness-led development strategy involving higher value added and stronger productivity growth throughout the entire value chain system represents one of the most promising opportunities for rapid and broad-based economic growth and wealth creation in sub-Saharan Africa and may be one of the few local paths out of poverty for the small farmer. This strategy is conceived within the context of interdependence of different sectors and actors in the value chain. Thus, without efficient industrial capacities, infrastructure, energy, innovation, trade, financing and agricultural supply, there can be no competitive agribusiness value chain development. In this approach, the weakest part of the chain represents the binding constraint on productivity growth of the entire agribusiness value chain, which should be addressed by industrial policy and strategy.

10.3. Key policy issues for private agribusiness growth and inclusive development

For decades, policy solutions for transforming Africa's stagnant agricultural sector into a vibrant agribusiness industry have been prescribed, with numerous actions plans such as the World Bank's "From Vision to Action" (1997), and its successor "Reaching the Rural Poor" (2003b). Yet remarkably little progress has been made, with the Bank admitting to "agroskepticism" on the part of many donors "which may well be related to their experience with past unsuccessful interventions in agriculture" (World Bank 2007a). Eicher (1999) pointed to attempts to "to replicate Asia's green revolution model in Africa before the completion of pilot studies" as one reason for policy failures, and accused 'experts of "falsely assuming that Africa had the requisite infrastructure, irrigated land, trained scientists, technology and national and local institutions to replicate the Asian model" (p. 31). Eleven years later, with its focus on science and technology, training and education, infrastructure and financing, this book highlights the reality that now, as twenty or thirty years ago, these factors remain binding constraints on agribusiness development. Three lessons flow from this:

Macro versus micro foundations of economic growth

Macroeconomic management has improved dramatically in Africa over the last fifteen years: budget deficits have been reduced, inflation has fallen, money supply growth has slowed, current account balances have strengthened, debt burdens have declined and economic growth accelerated. Despite this, numerous reports (see UNCTAD 2008b, 2009a, b; UNIDO 2002, 2004, 2005, 2009c; World Bank 2009b, d, 2010a; World Economic Forum, World Bank & AfDB 2007, 2009) illustrate the extent to which the improved macroeconomic performance has, thus far, failed to narrow the gap between firm-level performance in Africa and in other emerging regions, especially Asia. Lewis (2004) summarizes the situation in these words: "Many people look for the causes of poor economic performance primarily in macroeconomics. An evaluation of economic performance requires an analysis at the level of individual industries" (p. ix). Porter *et al.* (2006) takes the debate to another level, arguing that wealth creation occurs at the enterprise level, "in the

ability of firms to create valuable goods and services using efficient methods. Only firms can create wealth, not governments and other societal institutions” (p. 53). In this view, the microeconomic foundations of productivity rest on two interrelated pillars: (a) the sophistication and capabilities with which companies, domestic and foreign, compete; and (b) the quality of the microeconomic business environment in which they operate.

Drawing on this approach, analyzed in great detail in recent Global Competitiveness Reports of the World Economic Forum (2006, 2009), it is argued that policies and action agendas for the development of agribusiness in Africa must extend well beyond past fixation with macroeconomics. A strong macroeconomic platform is a necessary, but not a sufficient, condition for agribusiness development. In African countries where an appropriate macroeconomic platform is in place, the policy agenda must focus on microeconomic, enterprise-level, constraints that are obstacles to progress. As Easterly (2009) demonstrates, transformational approaches that ignore the need for country-specific, industry-specific, time-specific and above all, institution-specific solutions are doomed to fail.

Dynamic versus static environment

The overriding characteristic of the New Normal global paradigm is that the past is unlikely to be a reliable guide to the future. Technological progress, radically-different market conditions, shifts in the centre of global economic activity, and the addition of well over one billion workers from formerly command or semi-command economies in Eastern Europe, China and India to the global workforce have changed the rules of the development game. One such crucial change documented throughout this book is the emergence of value chains as a driver of economic growth and poverty reduction in underdeveloped regions. Consequently, future policies should focus not on agricultural development *per se*, but agribusiness development which brings in actors all the way along the value chain from small-holder farmers to multinational supermarket chains.

Institutions and sustained growth

A number of researchers have questioned the emphasis of development strategies on poverty reduction, noting many cases where countries have emerged from poverty traps, only to slip back into them at a later date (Birdsall, 2007). Poverty trap-based policies assume that ‘Big Push’ investment programmes, financed in part by foreign aid, will lift countries out of poverty. However, the failure of such programmes to achieve sustained growth has partially shifted the focus to institutional obstacles to development, captured in Birdsall’s “Weak Institutions Trap” (2007). Rodrik (2003) concluded that strong, well-functioning institutions are central to sustaining growth though not necessarily to “catalyzing” it.

These three issues—the need for policy to target microeconomic foundations within the context of a sound macroeconomic strategy; the acknowledgment that the world in 2010 is a very different place from that of the 1980s and 1990s; and the pivotal role of institutions—are the platform for an agenda for policy action. Five levels of policy interventions are required:

- 1) Those targeting trade logistics essentially investment in infrastructure, especially transport, energy, water and ICTs, underpinned by 'Doing Business' reforms designed to improve the efficiency of border controls.
- 2) Those targeting the quality of the microeconomic business environment a broad range of relatively minor reforms to reduce red-tape bureaucracy, such as time needed to register companies, to register and complete property transactions and technological readiness as measured by the speed and cost of Internet access. The yardsticks for these are set out annually in the World Bank/IFC's *Doing Business* reports.
- 3) Enabling measures to foster the upgrading of agribusiness value chains and to facilitate the development of agribusiness and agro-industrial clusters.
- 4) Targeted science, technology and training policies, with some shift in focus to skills development for agribusiness. Lewis (2004) and others stress the 'trainability' of workers emphasizing the crucial contribution of on-the-job, in-house, skills development rather than national level education strategies.
- 5) Accepting that without strong, well-functioning institutions it will not be possible to design, let alone implement, effective policies. Birdsall (2007), Easterly (2009) and others warn of the dangers that well-intentioned aid programmes may undermine the very institutions that donors seek to build. In Birdsall's words, donors should "systematically focus on avoiding harm to middle-income households, in particular avoiding creating disincentives to small entrepreneurial activity and job creation in the private sector" (2007, p. 588).

10.4. Growth diagnostics and binding constraints on development

A policy agenda for agribusiness development in SSA must be contextualized. The growth diagnostics approach proposed by the World Bank (2005) stressed the complexity of factors underpinning economic growth, warning that there is no unique policy formula. It recommended less reliance on simple formulas, and in their place using economic analysis to pinpoint one or two 'binding constraints' on growth. This approach was formalized in Hausmann *et al.* (2008), using a decision-tree methodology to help identify the relevant binding constraints for each country. While such an approach is intuitively attractive, there are some very real drawbacks: for a start, Hausmann *et al.* (2008) stress that it is concerned mainly with igniting, rather than sustaining, growth. In Africa, however, at a time when the economy has been growing more rapidly than at any time for the past 40 years, the policy focus is the very opposite—sustaining rather than igniting growth. In this respect, Rodrik (2007) argues that sustained growth will depend on long-term institutional changes. When the economy is growing rapidly, the challenge is to remove future, not current, constraints, which are not covered in the growth diagnostics approach. In targeting existing constraints, there is a danger that policy will become overly static and 'short-termist'. Where current spending is reduced to strengthen a country's fiscal balance, future binding constraints may be created due to inadequate investment in infrastructure.

Secondly, identification of binding constraints is a complicated task, rendered all the more difficult in underdeveloped economies with poor and unreliable avail-

ability of economic data. Moreover, constraints are country-specific, industry-specific and enterprise-specific, so that it is not possible to identify binding constraints for the continent as a whole. Such an approach harks back to ‘capital fundamentalism’—the assumption that capital is the pre-eminent binding constraint on growth. Lewis (2004) stresses that many developing countries could increase productivity without fresh investment by raising total factor productivity, so that in the short run, developing countries do not need more capital, but instead need to make better use of existing capital. Indeed, this is illustrated throughout this book, where although capital equipment levels are low, they are still underutilized, because of weak effective demand or supply-side bottlenecks, such as energy, water or transport. Above all, the approach prioritizes growth—partially excluding other policy objectives including poverty reduction (normally a function of *per capita* income growth), income distribution, environmental protection, and basic human needs—and thus it may run contrary to government policy (Felipe & Usui 2008). Four conclusions flow from this:

- 6) There can be no ‘one-size-fits-all’ strategy. Pritchett (2006) suggests that policymakers abandon the search for a single growth strategy and focus instead on policies suited to the particular circumstances of individual countries.
- 7) Nonetheless, some general truths hold good for all economies, not just emerging ones: the World Bank’s Growth Report (World Bank & Commission on Growth and Development 2008) identifies “five striking points of resemblance” in all highly successful countries. These are (a) openness to the global economy; (b) macroeconomic stability; (c) high savings and investment rates; (d) market allocation of resources; and (e) strong leadership and good governance.
- 8) However, as noted above, these fall short of being sufficient conditions for growth and development, which is where policy interventions are justified to establish the microeconomic foundations of growth, especially strong and well-functioning institutions.
- 9) In addition, Lin’s *New Structural Economics* (2010) advances the policy debate one step further as follows: “The old structural economics advocates development policies that go against an economy’s comparative advantage and advise governments in developing countries to develop advanced capital-intensive industries through direct administrative measures and price distortions. By contrast, the new structural economics stresses the central role of the market in resource allocation and advises the state to play a facilitating role to assist firms in the process of industrial upgrading by addressing externality and coordination issues” (ibid p. 20).

There exists without question a crucial role for the state in the ‘new structural economics’, but it is a very different role from that envisaged by the previous generation of policymakers. The state should play an active role in industrial diversification and upgrading through the provision of information about new industries, new market opportunities and new technologies, while also playing the role of coordinator of related investments across different firms, possibly through cluster formation. There is a vital role too for the state in improving hard and soft infrastructure, to reduce transaction costs faced by individual firms and facilitate industrial development (Lin 2010).

10.5. Evolving agro-industrial policy framework

As noted in chapter 8, economic liberalization under the Washington Consensus presented challenges for both agro-enterprises and policymakers in Africa. These challenges were embedded in a new approach to industrial policy, as developed by Rodrik and Hausmann (Rodrik 2004a; Hausmann & Rodrik 2003). This approach seeks to maximize the potential of the private sector for economic growth through investment in business opportunities, while minimizing the risks of public sector-generated policy initiatives for private sector development (see also Sen & te Velde (2007); Ramachandran (2000)). In response to the global economic and financial crisis of 2008/9, and the associated bail outs of banks, other financial institutions and car manufacturers, many governments are keen to accelerate manufacturing growth and employment through selected interventions (Crooks 2011). This has led to a new industrial policy dialogue focusing on revisiting industrial policy in the post-Washington Consensus period (see for example Williamson (2004); Summers (2008); Serra & Stiglitz (2008); Kanbur (2009); Kauffman (2010); Falk (2008)). There is also a growing concern over the effects of climate change and the need for environmental sustainability. A new industrial policy framework is needed, focusing on green industrial growth and clean energy within the framework of a resource-efficiency and low-carbon growth trajectory (UNIDO 2010). This is particularly true for certain African countries that have witnessed increased investment in oil exploration; high-carbon projects including new large-scale thermal power stations; capital-intensive energy projects, as well as many other non-green investments with adverse environmental and social implications.

Critical policy choices

Within the context set out above, there is broad agreement on the way forward for the development of African agribusiness; however, controversy remains over a number of important agribusiness policy issues that merit closer consideration (Wiggins & Leturque 2010):

- Production of genetically modified foods remains a contentious issue in Africa with opinion divided as to whether genetically modified organisms (GMO) opportunities, especially increased productivity, are offset by long-term health concerns.
- The issue of optimal farm size is a point of debate. Whereas small farms need less capital, large farms can reap economies of scale; participation of small farms in value chains is complex due to coordination and product quality concerns (Box 10.1).
- Disagreements over the long-term impact of climate change, which make it difficult to design appropriate adaptation and mitigation policies for Africa (Cantore *et al.* 2009).
- Biofuel value chains present opportunities for agribusiness, though there are question marks over the potentially negative impact on food prices and food security.
- Widely divergent market and business environment conditions in different African countries mean that policies for agribusiness development need to be carefully tailored.
- Debate over whether purchases of large portions of agricultural land by foreign investors present a so-called 'land grab' or opportunity.

Contentious issue	Pros	Cons
GMO food	GM crops and livestock are more productive	Production of GM food raises health concerns for consumers
Farm size	Large farms induce economies of scale and production cost reductions	Large farms may be inappropriate due to land- tenure systems and the lack of capital. Participation of small farms in value chains is complex
Impact of climate change	The adoption of mitigation and adaptation policies will reduce GDP losses in a context where climate change impacts will massively affect Africa	Early huge mitigation and adaptation costs may affect growth and development goals
Biofuel value chain	Use of environment friendly sources of energy may reduce long-term mitigation costs	The increase of food demand for non-nutrition purposes may raise food prices and compromise food security
Country/regionally - tailored policies	More effective as they incorporate specific circumstances	Lack of coordination at higher level
Purchase of large portions of land	Foreign investors bring finance, technology, know-how and increase production and productivity	Potential land conflicts

The debate on these issues is ongoing. Table 10.3 summarizes the advantages and disadvantages of each broad policy proposal and explains the trade-offs that decision makers must tackle when they are dealing with these issues.

In addition to these agribusiness-specific issues, there are, more generally, diverging views and policies among world economic players on global policy issues, which have an impact on overall industrialization and agribusiness development in Africa. These relate to problems in solving global economic imbalances in three areas of critical importance: a) although there is general agreement among global players (G20 2010) to reduce global trade imbalances and refrain from competitive devaluations of their currencies, moving towards more market-oriented currency systems and resisting protectionism, it remains to be seen to what extent major currencies and trade policies will be realigned according to market principles in the future; b) subsidies to farmers in industrialized countries in the magnitude of \$265 billion in 2008, which affect agricultural income and development in developing countries; c) continued stalemate in global trade negotiations keeping in mind that global trade liberalization, such as the Doha Round, is in principle superior and will generate greater benefits to African countries than the second best strategy of regional or bilateral trade agreements, which have mushroomed in recent years (UNIDO, 2006). The main stumbling block to the Doha Development Round

negotiations remains as to whether emerging economies will agree to greater market access to their markets in return for lower tariffs on their agricultural products. In this context it is critical that the strategic interests of Africa's agribusiness value chains are fully taken into consideration in these global negotiations.

Box 10.1: The small versus large farm debate

In recent years, the terms of the debate between advocates of large-scale commercial agriculture on one hand, and the 'small is best' school on the other, have become increasingly blurred. A major reason for this is recognition of the heterogeneous nature of smallholder agriculture.

A second strain of the argument reflects changing global patterns of demand and supply, encapsulated in the development of increasingly sophisticated value chains. Two related aspects of value chain analysis are recurrent themes of this book—the high transaction costs incurred in linking smallholders with value chains, and the impact of health and other consumer-driven standards in raising entry barriers to smallholder participation in value chains.

A third is the experience of the world's sixth largest agricultural exporter and largest emerging market exporter—Brazil—whose success has been driven in part by the shift from smallholder to large-scale farming, in which outgrower systems are playing an important role, highlighting once again the central role of value chain participation.

Then there is the reality of labour supply: as education standards improve, so the supply of young people willing to work as smallholder producers will dwindle. In this respect, Collier (2008) writes: "Peasants seek local wage jobs and their offspring head to the cities". Since both capital and technology are scarce inputs into smallholder farming, what will drive growth if labour also becomes scarce? The development of contract farming and outgrower systems has allowed smallholders to become managers, rather than entrepreneurs. In these arrangements, the entrepreneurial functions are shouldered by the contracting firm that supplies the inputs and finance, and takes care of downstream value chain operations.

Above all, there is the neglect of the institutional dimension—land ownership systems. In 2005 the Blair Commission for Africa estimated that only about 1 per cent of land in Africa was registered under a formal land title system (Commission for Africa 2005, p.231). Given the heterogeneity of smallholder systems, there is no magic bullet solution. Rather, a menu of options embracing the recognition of customary tenure, much-improved land titling and registration systems, the documentation of land rights and, above all, the development of land rental and land sales markets are necessary. The latter are fundamental to a productivity revolution in African agriculture since agglomeration will take place over time—a trend that will be facilitated by the development of an efficient market for land.

Policymaking is further complicated by the degree to which smallholder agriculture is part of a complex socio-economic system. From a policy viewpoint, what matters is creating the appropriate enabling environment for the most efficient use of land, socially as well as economically, while simultaneously implementing reforms that will enhance farm productivity regardless of unit size.

10.6. Translating strategies and policies into action

This book has emphasized that the onus of investing in and developing the African agribusiness and agro-industry sectors falls upon the private sector, with the public sector playing a facilitating and supporting role. This section summarizes the framework for agribusiness policies, strategies and institutions analysed in the seven development pillars in Part B (chapters 3-9). The main critical policy, strategy and institutional options proposed are highlighted in the following areas:

Enhancing agricultural supply response to value addition

Integrating Africa into global agribusiness: deeper integration into the world economy is critical for structural economic transformation and for agribusiness development and competitiveness. This applies in particular to access to knowledge, information and technology for capability building, for improving access to global value chains and markets as well as for mobilizing FDI. Industrial stakeholders would need to be aware of the rapidly changing facets of global new agribusiness realities.

Promoting agribusiness development as path to wealth creation: most African countries still have an urgent need to diversify economies towards higher value-added products and break away from exports with little or no value added, and the resultant lack of employment and income generation. Value addition in agribusiness value chains is an important development path to wealth creation and an essential complementary strategy for structural transformation, economic diversification and technological upgrading for competitiveness.

Learning from agribusiness policy experience of emerging economies: a common feature emerging from the successful experience of emerging economies is that agribusiness and agro-industrial development was the result of deliberate government policy and strategy towards diversification of their economies and the development of competitive industries. Equally important is the need to draw on the successful agribusiness experience in Africa, such as South Africa, Egypt and Tunisia.

Intensifying regional integration within Africa: the need for intensified regional integration has been emphasized in all development pillars. Regional integration can be an important instrument for achieving full economies of scale both in the production of agro-industrial products, farm machinery and processing equipment for larger markets, and in the provision of key infrastructure services, such as roads, electricity, water and ICT. Special priority could be assigned to completing transport corridors, especially for landlocked countries, and locate new agribusiness programmes in physical proximity to such corridors. Moreover, by ensuring better coordination between the institutions and key stakeholders of different countries, regional integration can facilitate harmonization in critical areas, such as policies, trade, institutions, science and technology, product standards and the establishment of simplified customs procedures and financial services.

Establishing priorities for sustainability and social inclusion: establishing priorities and ensuring policy coherence, in particular with regard to fiscal policy priorities (for example, infrastructure investment), should be set up according to the specific country situations. All these actions share a common characteristic to

promote sustainable industrial development, employment opportunities, wealth creation and social inclusion.

Addressing market failure: A general principle arising from our analysis is that policies are needed to introduce or strengthen market mechanisms and to address market failures generated by asymmetric information, externalities and public goods that affect the implementation of the agribusiness development pillars, and to ensure the existence of the necessary conditions to promote market mechanisms, such as institutions and laws. The participation of different actors in this process will be essential:

- 1) **National and local policymakers** need to establish and enforce the legal system especially with respect to land titles and land registration systems, as well as creating regulatory framework for contract farming. Also needed is the introduction of market institutions, such as robust regulatory frameworks for the banking sector to encourage access to capital. National policymakers will have a crucial role in future international agreements about trading and environment together with important international organizations, such as the United Nations Framework Convention on Climate Change (UNFCCC) and the World Trade Organization (WTO). They need to strengthen factors for sustained growth whenever possible, such as enabling environment for private sector, infrastructure and energy supply.
- 2) **Learning institutions for tertiary education and universities** will play an important role in creating and sharing knowledge, international education partnerships and stronger links with the private sector, both within Africa and globally, to enhance the practical level of skills through on-the-job training and in-house skill development.
- 3) **Government measures** to reduce the very high trade and transaction costs of doing business are needed to improve the competitiveness of African agribusiness. Firms that face higher costs than their competitors for electricity, water, telecommunications, transport and logistics, finance, custom services and border regulations, and bureaucratic procedures will find it difficult to compete in either export or domestic markets. Governments will need to address the challenge of fostering competition in the provision of such essential services for agribusiness.

Strengthening capability of governments: The capability of African governments themselves to deal with complex policy agendas is of crucial importance, as they can influence the development of agribusiness value chains through appropriate laws, budgetary priorities and institutional arrangements. The lack of good quality and appropriate inputs is a core element affecting African agribusiness, whether from demand-side (low effective demand) or supply-side conditions (transaction costs, infrastructure).

Enhancing agricultural productivity through industrial inputs: Increasing agricultural productivity, and ensuring adequate, regular supply and quality of agricultural raw materials for industrial processing, through more judicious use of industrial inputs into agriculture, are essential for developing a vibrant agribusiness sector. It is important to combine such productivity enhancements with reductions in post-harvest losses through more efficient processing, improved storage, transport, packaging and distribution. Three issues are closely linked to this context:

- 1) **Strategies for improving fertilizer value chains:** sustained productivity growth in agriculture will be possible only with very large increases in the use of inorganic fertilizers from the current very low average levels. This includes the development of more efficient fertilizer and crop protectant value chains for both domestic production and imports.
- 2) **Technology policies for agricultural mechanization and agro-processing equipment:** African agriculture remains substantially undercapitalized and there is an urgent need to take a fresh view of the role of agricultural mechanization and processing equipment. In particular, mechanization of agriculture at all levels should be promoted wherever economically viable. However, care should be taken that the use of labour saving technology does not compromise overall employment objectives and should promote competitiveness.
- 3) **Strategies for enhancing supply of water and irrigation:** the availability, quality and cost of water will be an increasingly important factor in the location and profitability of agribusiness activities. Both farming and agro-industries are typically heavy users of water. Climate change, increasing population pressures, and rising energy costs are all making water increasingly expensive; changes in the cost of water across different regions will affect where large international agribusinesses choose to source their products, giving water-abundant areas in sub-Saharan Africa a potential advantage.

Upgrading farms and firms for entry into value chains: this book recommends the value chain approach as a basis for developing agribusiness in Africa, comprising all stages from ‘farm to fork’ and involving all actors in the chain—farmers, industrial entrepreneurs, marketing and retail experts, transport and logistical experts. Value chains can increase producers’ incomes and ensure stable supply of raw materials to industry, while vertical coordination can contribute to price stability. The weakest part of the value chain determines the level of efficiency of the whole system and represents binding constraints to be addressed. Upgrading informal operations to formal is essential for participating in international value chains. Survival of the fastest and fittest is critical for exploiting first-mover advantage and nurturing potential lead firms for regional value chains. Standards can be a launching pad for upgrading. Location policies can serve as an important tool for achieving economies of agglomeration through cluster development, and location close to infrastructure and energy facilities as well as major markets and cities.

Establishing Value Chain Participant Councils (VCPCs): strategic positioning through upgrading and regrading in agribusiness value chains can be facilitated by public-private sector dialogue and the establishment of VCPCs. Such councils will coordinate the functions and activities of key stakeholders, including various government ministries—especially industry, trade, finance, science and technology—as well as private sector entrepreneurs, investors, development partners and other players. Actors from all links along the value chain should be involved in the policy and implementation process. In this context an important function of VCPCs will be to ensure horizontal and vertical coordination of all actors in different value chains.

Improving agro-industry trade and competitiveness

Promoting aid for trade: many African countries have been unable to tap into dynamic market segments of global agro-industry trade, due to lack of competitiveness and inability to adapt export supply to changing market opportunities. Regional and domestic markets in Africa, in addition to rapidly growing emerging markets, offer the most promising market opportunities for African agribusiness. The impact of trade liberalization on exports and diversification has been undercut by poor policy implementation. Trade preferences can serve as a catalyst for manufactured exports, provided they are designed to permit import of complementary inputs and to operate in countries with sufficient skills and infrastructure (Collier & Venables 2007). Making effective use of aid for trade could address these main barriers and seize new opportunities in regional and international markets. Increased investment in regional infrastructure and support to strengthen trade-related institutions, such as standards and accreditation bodies, customs and trade promotion agencies, within a regional framework, are likely to generate great benefits. In addition to ensuring efficient connectivity to markets the following, two elements are critical for the success of aid for trade:

- 1) **Building capacity to trade:** specific institutions and measures will be needed to overcome supply-side constraints and increase response to trade preferences. Such institutions and services include business advisory services, incubators, export and investment promotion agencies, export consortia, skills development institutions, as well as innovation, clustering and networks. Although such institutions already exist in many developing countries, they often operate in isolation and tend to be ineffective. The challenges lie in ensuring they function within a coherent and integrated framework; for this purpose, an empowered trade and competitiveness policy unit (and competitiveness observatory) within government could be established and assigned responsibility for overseeing and guiding the activities of these agencies in order to ensure that they function in a cooperative manner within the framework of an integrated value chain approach.
- 2) **Strengthening standards and compliance systems:** exporters need to comply with a multiplicity of standards related to health, safety and environmental requirements of importing countries. These issues are part of two WTO agreements on technical barriers to trade (TBT) and sanitary and phyto-sanitary measures (SPS). African exporters would need to be able to produce according to these standards and prove conformity in order to gain access to global markets. This is especially important for business strategies aimed at product diversification towards high quality products, niche and speciality products, such as organic food and beverages, fair trade, origin-based products, functional or nutritionally-enhanced food products. However, for many producers, value addition through standards certification is difficult due to a lack of management skills and high costs. Moreover, while standards generally increase production costs for both domestic and foreign firms, one cannot make unequivocal connection between falling tariffs and subsidies and rising standards (Essaji 2010).

Promoting agribusiness cooperation within the South: practically all countries have opened up and restructured their economies along market-oriented lines and in the process improved their linkages to global trade networks (Henneberry 2009; OECD 2009a). Largely through unilateral liberalization at different periods over the past two decades, they have implemented tariff cuts and reduced non-tariff trade barriers. FDI was liberalized with fewer restrictions on entry, ownership, establishment and operations in the domestic economy. However, greater state intervention and ownership and antagonism to FDI have emerged in some resource-rich countries. Distortions still remain in international trade, including tariffs and non-tariff barriers. These barriers would need to be reduced, in particular for developing intra-African regional value chains, as well as intra-South value chains in agribusiness.

- 1) **Reducing high intra-African tariff and non-tariff barriers:** regional and domestic markets in Africa offers the most promising market opportunities for African agribusiness. Yet regional trade remains very limited due to high intra-African tariff and non-tariff barriers, weak transport links and obstacles related to the regulatory and operational framework for cross-border trade, cumbersome customs procedures and documentation, logistics, as well as non-convertibility of African currencies at regional level with conflicting monetary and financial regulations at national levels. A significant reduction in such barriers would need to be negotiated among countries and Regional Economic Communities (RECs) and implemented by competent authorities. A related proposal by the United Kingdom and South Africa refers to the establishment of a free trade area for Africa, instead of the current three distinct free trade areas, to help the impoverished continent to aspire to the spectacular growth of East Asian economies.
- 2) **Reducing tariff and non-tariff barriers within the South:** an important opportunity for expanding Africa's agro-industrial exports arises in connection with the continent's growing trade with emerging economies such as Brazil, South Africa, China, India, Indonesia and other countries. Such opportunities will be greatly improved if emerging economies could be persuaded to make binding commitments on duty-free, quota-free access to African agribusiness exporters⁵⁶. Both China and India apply tariffs on agricultural imports that are higher than what Africa currently faces in its traditional markets in the EU and US. Fortunately, there are encouraging signs on tariff reduction as Brazil and India are finalizing plans to offer duty-free and quota-free access to LDCs, covering products such as cotton, cocoa, cane sugar and ready-made garments (WTO 2010).
- 3) **Facilitating agribusiness cooperation within the South:** in the field of Regional Trade Agreements (RTAs), technology and FDI. South-South trade has emerged as one of the most dynamic elements of global manufacturing and trade

56. As such endeavors evolve two important considerations need to be borne in mind. First is the need to ensure that there are no exceptions that will exclude important African exports. Second, it would be useful to explore the possibility of converting the offers of duty-free and quota-free access from emerging countries to binding commitments under WTO Agreements. At present, the relevant WTO Agreement states that 'developing countries in a position to do so' (i.e. capable of offering such preferences) should offer them. This leaves it to each emerging country to decide whether it would extend preferences without making binding commitments.

(UNIDO 2006a). The growing interdependence of developing Asia was a result of intensified intra-industry linkages and cooperation due to integrated production networks and sub-contracting arrangements as well as through RTAs (UNIDO 2006a). This makes the establishment and facilitation of innovative regional value chains for intensified intra-industry linkages and RTAs important items in the revised agenda for industrial and trade cooperation initiatives. A critical issue will be to assess how African agribusiness can capture a growing market share in the rapidly growing emerging economies, especially aimed at the purchasing power of the new middle class. Establishing inter-regional RTAs could potentially create opportunities for reducing the high most favoured nation (MFN) tariffs currently imposed on African agro-industrial exports and induce investment in agro-processing in Africa. This could also pave the way for intensified cooperation in the field of technology transfer and FDI flows within the South (UNIDO 2006a).

- 4) **Africa-China cooperation in trade, technology and FDI:** a policy issue of strategic importance is to link Africa's quest for agro-industrial processing with China's quest for natural resources and facilitate growing participation of African agro-industry in the Chinese value chain, possibly linked to China's FDI in Africa and formalize such cooperation through regional and bilateral agreements. Doves-tailing 'China's resource priority' with 'Africa's processing priority' requires a fresh approach to China-African cooperation in agribusiness.

Promoting agribusiness cooperation with developed countries is also crucial for agribusiness development in Africa. Such cooperation could be strengthened in the following areas:

- 1) **Reducing tariff escalation in developed countries:** African exporters face below-average tariff rates in the European Union and United States markets for some products, while LDCs enjoy free market access to the European Union. Yet various levies (e.g. Value added tax (VAT)) and surcharges are applicable to imported and locally-produced intermediate inputs into agricultural production and processing. In the European Union, while the number of commodities subject to escalating tariffs is declining, tariff escalation is still applicable to many commodities, such as cocoa, tomatoes, palm oil, soya, leather and cotton. Such escalating tariffs clearly run counter to Africa's quest for increasing value added in agro-industrial processing. A reduction in such escalating tariffs in developed countries would need to be negotiated in the context of bilateral and multilateral trade negotiations.
- 2) **Negotiating Economic Partnership Agreements (EPAs):** African countries would need to focus on trade creation and consider how to minimize trade diversion and achieve development oriented EPAs. Many African countries have already entered a new phase of the EPA negotiation process following the initiation of the interim agreements. These countries now have an opportunity to negotiate EPAs that will contribute to improving the competitiveness of African value chains through reducing internal and external trade barriers and promoting proactive policies to overcome supply-side constraints and trade-related adjustment costs.

Technological efforts and capabilities

Strengthening STI policies: a strengthening of STI policies and related infrastructure is crucial for accelerating the productivity revolution required for rapid and sustained agribusiness growth in Africa. There is need for new and better formulated STI policies and strategies and implementation, in order to achieve dynamic agricultural and broad-based agro-industrial development based on better data coverage and indicators systems. The adoption of appropriate STI policies, private-public sector collaboration, as well as the creation of innovation platforms by producers themselves, is essential. Above all, STI inputs would need to be systematically incorporated into production and marketing functions along the entire agro-industrial value chain from farm to fork.

Improving coordinating mechanism for learning and innovation: technical learning in agro-enterprises could be supported by public policy action that could help improve the coordination mechanism within value chains, because such coordination determines both the speed of innovation and the level of competitiveness.

Promoting national and regional innovation systems: agribusiness development can be supported by focusing on the five main pillars⁵⁷ of the national innovation systems (NIS). Public action is needed to strengthen linkages both within and between the pillars, and with the enterprise sector. NIS institutions would need to be upgraded and both NIS and STI policies more closely linked with national economic policies. Moreover, subregional and sectoral innovation systems can complement the formulation of new agro-industrial policies.

Strengthening human resource development: it is critically important that strategies for human resource development and the building of institutional STI capacities be formulated at national levels by responding to the practical needs of private sector enterprises, particularly in terms of on-the-job training and practical learning experience.

Improving STI infrastructure: development of STI infrastructure should be closely linked with African agribusinesses in global and regional markets in order to stimulate innovation and profitability. Indeed, new knowledge is created by universities, exploited by laboratories and commercialized by private enterprise.

Financing and investment

Facilitating an umbrella fund for agribusiness financing: the key to unleashing resources from the private sector is to increase profitability, reduce risk and mobilize both traditional and innovative sources of finance. Long-term investment in agribusiness can be promoted most efficiently in countries or areas, which enjoy investment-friendly enabling environments, combined with solid technological effort, innovation capacity and capability leading to efficient value chain operations. Facilitating financing for agribusiness through domestic resource mobilization, sovereign wealth funds, leveraging diasporas, development finance institutions, microcredit, targeting FDI, leasing,

57. The five key pillars of NIS are: 1) The enterprise sector—farms and firms of different size and ownership—is the central pillar; 2) Research and development, education, training and other skills development institutions; 3) Innovation finance institutions; 4) Intellectual property protection agencies and technology and business support systems; and 5) Public regulatory agencies for company registration and licensing, environmental protection agencies, and agencies for property protection and land use issues.

expanding collateralization and developing appropriate banking models and regulations, represent some of the measures for improving financing to agribusinesses. Moreover, risk mitigation for bank lending through insurance and reinsurance schemes, external finance through large lead firms in value chains, equity, venture and hybrid capital finance for smaller businesses represent some of the more innovative financing tools and models. These can be combined in a coherent strategy to boost and improve financing to agribusiness at all levels, including through the instrument of umbrella funds to stimulate investment and lending to the sector.

Creating conditions for local resource accumulation and investments: creating conditions in which local communities, local governments, NGOs and the private sector mobilize their own resources to invest in agribusiness is essential. Identifying such types of investments and public actions, which 'crowd-in' rather than 'crowd-out' private investment, is a key to developing productive public-private partnerships. Ultimately the onus of increasing investment and facilitating the financing of agribusiness in Africa lies with the private sector, with African policymakers in the public sector playing a facilitative role to lessen the risk premium for the sector.

Enabling business environment

Promoting private enterprise: the onus on developing agribusiness and generating productive employment in Africa rests on the private sector, supported by policy in selected areas. The new policy approach emphasizes 'created' competitiveness, in addition to 'inherited' comparative advantages, and sees policy reforms in the business environment as the basis for creating conditions that would help enterprises to grow and compete internationally. The creation of an overall enabling environment for enterprise development requires favourable business environmental factors that are not determined by the internal capabilities of the enterprise. The most important of these business environment factors are: macroeconomic stability; global market conditions; favorable exchange rates; financial system and institutions, political and social stability; governance; land- tenure; business climate; business advisory services and support services; business incubators; export consortia; global value chains; cooperatives; EPZs, free trade zones, investment parks; competitiveness observatory; entrepreneurship promotion and corporate social responsibility. Moreover, knowledge creation and diffusion is a key element in creating agribusiness capabilities for several development pillars. African agribusiness can enhance the practical skills of people, the experience of workers during their jobs through clusters and value chain associations, as well as research and development in public and private institutions.

Infrastructure and energy services

Public-private partnership in providing infrastructure services: long-term investment in, and expansion of, agribusiness can be promoted most efficiently in countries or areas that have already developed an adequate infrastructure base, combined with efficient energy services and an enabling business environment. Agribusiness development should therefore primarily be promoted in countries or areas where the necessary infrastructural improvements have been or are being made in transport infrastructure, such as the new transport corridors and highways. This is essential in

order that raw materials and agro-products can move rapidly and efficiently from farm gate to processing facilities and to other parts of the value chain such as transportation, bulk storage, cold storage facilities and distribution systems.

Public-private partnerships in promoting sustainable energy services: a focus on clean, renewable, efficient and sustainable energy service as well as reduction of GHG emissions is an important strategy for mitigating the impacts of climate change. Three policy and strategic issues are important: 1) The need to focus on innovative technologies to satisfy local, including rural, demand through incorporating decentralized energy distribution services and redefining rural energy services; 2) Improving locally available energy supply resources with a focus on widening the energy choice such as hydroelectricity, solar, wind and geothermal energy sources; 3) Strengthening agro-industry as a potential source of energy through sustainable ethanol production, electricity and thermal heat through biomass production.

Promoting ICTs for participation in value chains: the use of ICT is not only a precondition for participating in agribusiness markets and value chains, but also play a critical role in facilitating access to knowledge, information sharing and communication, opening up new frontiers for technology innovation, trade, marketing and cooperation. To enhance agribusiness growth potential, it is essential to expand ICT in the agribusiness value chain, including to farmers in rural and remote locations, for example through instant advice on fertilizer application. Timely access to market information will serve to enhance bargaining power, raise profits and increase production volumes to allow agro-industrial processing plants to operate at optimum capacity.

Participating in the world carbon market: national industrial development actions will need to take into account that climate change affects industry and possible adaptation measures (industry relocation, energy sources provision) will have to be carefully analysed and implemented. Moreover the future evolution of global climate change agreements could provide important opportunities for Africa in terms of carbon finance and the Clean Development Mechanism (CDM). In particular the CDM could be the future driver of technology diffusion processes in Africa and of the creation of green jobs and investment opportunities through the penetration of renewable sources of energy. If the institutional implementation arrangements can be worked out to link African farmers to world carbon markets, there is a potential for carbon sequestration among small farmers to become an important new 'cash crop' in SSA. Better management of agricultural by-products and manures can lead to greater local production of biogas to fuel farm and agro-processing operations (World Bank 2007a).

10.7. Synopsis of determinants for policy, strategy and institutional development

On the basis of the analysis presented in this chapter, Table 10.4 provides a synopsis of critical determinants and options for policy, strategy and institutional development, as well as broad indicators, actions and actors of the seven development pillars for private sector agribusiness development in Africa. These policy options would need to be translated into a programme framework and supported by appropriate development assistance programmes by the international community. These issues are discussed in the next chapter.

Development pillar	Critical factors	Indicators	Actions	Actors
Agricultural supply for agribusiness value chains and competitiveness	Labour	High availability, but low quality in terms of health, literacy and education	Education system enhancement, on-the-job training	National and local decision makers, universities, private companies
	Capital goods	Lack of mechanization in many countries and lack of high productive inputs use	Improvement of inputs (demand side) and supply side conditions	National policymakers, trading operators, local communities
	Land	Limited land for agricultural expansion at continental level; social exclusion and pessimistic estimates from global warming if no action is taken	Promotion of sustainable pro-growth agricultural technologies; land reforms	National policymakers, local decision makers and communities, real estate administration agencies, donors
	Value chain conditions	Fragmented supply conditions, scarce vertical integration and economies of scale. Often market power of retailers towards farmers	Measures to promote cooperation amongst firms in a value chain (bureaucracy, laws, infrastructure), enhancement of outgrower schemes	Foreign investors, national and local authorities, local communities, consortia
	Certification system for commodities and quality food products	Market access barriers to small-scale farmers because of high certification costs	Aid for trade	Consumers associations, certification organisms, decision makers, donors, multilateral institutions
Demand	International demand	Lack of integration with international markets and absence of certification bodies to signal quality of food	Strengthening of the 'demand pull' side African agro-food marketing system	International consumers, private companies, national policymakers, local communities
	Internal demand	Higher levels of poverty in sub-Saharan Africa and low levels of income per capita to boost internal demand	Industrial development	National policymakers, local governments and communities

Table 10.4: continued				
Development pillar	Critical factors	Indicators	Actions	Actors
R&D	R&D	Low level of public R&D and of private initiatives for innovation	University-private partnership. Innovation institutions. Promotion of transboundary knowledge spillovers	Universities, private companies, national and international policymakers, donors
Business climate and trading	Policy	Inefficient domestic economic policies of some African countries' governments	Use of domestic policy instruments on the basis of sound economic principles (eg addressing market failures)	National and local policymakers
	Trading	Distortive international sector specific subsidies and import tariffs	Educating on the international community for appropriate trading agreements	Multilateral institutions, private companies, trading operators, national and international policymakers, civil associations
	Institutional context	Weak enforcement of laws; weak institutions	Enhancement of the legal system and enforcement mechanisms	National decision makers and citizens
Finance	Financial system	Fragile financial systems vulnerable to crisis and commodity price fluctuations; credit restrictions	Linkages to international financial systems and investors. Robust regulatory framework and institutions to eliminate market failures	Banks, donors, DFIs, private investors, social/impact investors, national and international policymakers
	Value chains	Inadequate linkages along chains	Incentivizing and assisting finance providers to leverage value chain relationships to improve access to finance	Central banks, commercial banks, DFIs, private investors, social/impact investors, large scale value chain actors, national policymakers

Table 10.4: continued				
Development pillar	Critical factors	Indicators	Actions	Actors
Infrastructure, energy supply, sustainability	Infrastructure	Poor infrastructure leading to high transaction costs	Transport and communication systems integration plans, ICTs and pooling of resources across countries. Public/private partnerships. DFI loans	DFIs, national policymakers, donors, banks and finance providers, private companies
	Energy supply	Increasing need in the coming years, unreliable supply system	Green sources of energy. Low carbon path. CDMs and carbon finance	International and national policymakers, local communities, private companies
	Sustainability	High vulnerability of many African economies to climate change	Adaptation policies	Multilateral institutions, national and international policymakers and local governments, private companies
Social exclusion	Inequality and poverty	Strong economic inequality	Industrial development	National and local policymakers, local governments and communities

11. A programme framework

Patrick M. Kormawa and Torben M. Roepstorff

11.1. Introduction

This final chapter outlines a new programme framework for agribusiness development to be undertaken by key agribusiness stakeholders in cooperation with the international development community. The programme framework is intended to supplement and complement endeavors by African stakeholders, such as the Accelerated Industrial Development of Africa (AIDA) and the African Agribusiness and Agro-industries Development Initiative (3ADI) in advancing agribusiness development in close cooperation with the international community and global actors. It adopts a programme-based approach to agribusiness and agro-industrial development in Africa. The framework is based on the seven development pillars and is intended to support the overall national and regional policy approaches for agribusiness development.

The programme framework is based on the following six components:

- 1) Public-private sector dialogue on agribusiness development
- 2) Technical cooperation for agribusiness development
- 3) Aid for trade for agribusiness exports
- 4) Global agribusiness partnerships
- 5) Agribusiness knowledge and information sharing
- 6) Programme governance

A summary of the Agenda for Action is provided in Box 11.1.

11.2. Public-private sector dialogue on agribusiness development

In order to create awareness of opportunities and at the same time pinpoint challenges and preconditions, it is important to launch a public-private sector dialogue

with key stakeholders and actors in agribusiness value chains. These actors include producers, entrepreneurs, actors in trade, marketing, distribution, logistics and finance; representatives from the public sector such as government ministries, technology institutes and innovation bodies; and donors and other national and international partners. Such dialogue is considered an important step towards accelerating agribusiness development in Africa by discussing issues and approaches, as well as disseminating information and analysis of the current state of knowledge of agribusiness development, including the findings of the present agribusiness analysis.

Programme objectives

To create awareness of opportunities and challenges and to establish dialogue with key stakeholders, within Africa and globally, in the public and private sectors for developing agribusiness value chains, and further soliciting interest at the continental, subregional and national levels with a special focus on the prospects for intra-African value chains.

Indicative projects and actions

To launch public-private sector dialogue at two levels:

- 1) Agribusiness fora for developing and implementing agribusiness value chains, focusing on awareness creation and policy dialogue with key stakeholders and international partners in each of the five subregions (North, East, West, Central and Southern Africa).
- 2) Agribusiness Value Chain Participant Councils with key stakeholders at the national and international levels for enhancing horizontal and vertical integration and coordination.

11.3. Technical cooperation for agribusiness development

Agribusiness value chains have been successfully developed in a few African countries and valuable experience has been gained in this process (see chapter 4). In order to generate more widespread agribusiness knowledge and development throughout Africa, it is essential to create the necessary conditions for competitive development in a broader range of countries and areas and to learn from the experience already gained within the continent and more widely in emerging economies. For this purpose, advisory services for policy development, institutional mechanisms and business environment are needed to build capacity for advancing agribusiness value chains.

Programme objectives

To formulate and implement integrated technical cooperation programmes for competitive and sustainable agribusiness value chains through a range of technical advisory services at the policy, institutional and business environment levels, based on best practice and aimed at overcoming binding constraints in critical parts of the value chain.

Indicative projects and actions

- 1) Formulate and implement agribusiness value chain visions, strategies, policies and institutional support, including preparatory assistance in diagnostic analysis of agribusiness resource base, potential for value addition and binding constraints.
- 2) Strengthen agricultural supply chain for agro-industry processing in growth poles and clusters.
- 3) Improve industrial supply chain for increasing agricultural productivity and efficient processing.
- 4) Assess industrial competitive performance *inter alia* through the establishment of industrial competitiveness observatory and annual feedback for policy dialogue and response.
- 5) Upgrade technology, innovation capacity and human capability, including maximizing spillovers from FDI.
- 6) Develop models of SME and agribusiness value chain finance.
- 7) Promote agribusiness value chains in rural areas and cooperatives in selected locations.
- 8) Public-private sector cooperation in overcoming infrastructure and energy constraints.
- 9) Undertake study tours, provide internships and on-the-job exposure to best agribusiness practice through clusters and value chain associations.
- 10) Foster stronger regional cooperation within Africa in the above areas.

11.4. Aid for trade for agribusiness exports

With few exceptions, African industry has yet to develop capacity to seize emerging market opportunities in potential export markets for higher value-added agribusiness and agro-industry products both in developed countries and emerging economies. Africa's agribusiness export potential can be unleashed if supply side constraints are overcome and preconditions met for entry into global markets and value chains. While African countries, particularly LDCs, enjoy trade preferences in developed countries these market opportunities have yet to be exploited. Similarly, the newly emerging developing countries are growing rapidly and offer new market opportunities for African agribusiness and agro-industry export products. Two major issues arise in this regard:

1. To build the technical capacity at national level to produce and export competitive, safe, reliable and cost-effective agro-industry products.
2. To meet internationally recognized product and process standards and establish related compliance systems, in order to gain access to markets and global value chains .

58. For countries that are acceding to WTO, conformity infrastructure is needed to fulfill the requirements under the TBT agreement and the agreement on the application of SPS measures. The growing significance of products standards are particularly related to food hygiene and food safety (ISO 22000), quality management (ISO 9001), environmental management (ISO 14001) and social accountability (SA 8000) and upcoming social responsibility (ISO 26000).

Programme objectives

To strengthen the capacity of African industry to participate in the global agribusiness trading system and value chains by building capacity to produce and export agribusiness and agro-industry products in promising export markets, both in developed countries and emerging economies; to seize market opportunities on the basis of existing or new trade preferences and; to help enterprises comply with international product standards and market requirements and establish the required product and process compliance systems.

Indicative projects and actions

- 1) Building capacity to trade in agribusiness products.
- 2) Strengthening standards and compliance systems.
- 3) Enhancing national trade-facilitating institutions to promote exports.

11.5. Global agribusiness partnerships

This study has advocated the need for deeper integration of Africa into global agribusiness by establishing links with key actors in the field of technology, innovation, trade, finance, investment and capacity building. This involves both international cooperation at the level of individual enterprises, and trade negotiations at the governmental level with developed and emerging economies, including South Africa, Egypt and Tunisia.

Programme objectives

To accelerate agribusiness value chain development in Africa, through intensified partnerships with dynamic international value chain actors in the field of technology, innovation, trade, finance, and investment in developed and emerging economies through negotiation and cooperation.

Indicative projects and actions

- 1) Partnerships in agribusiness technology, mechanization, innovation, trade, investment and FDI with the rapidly growing emerging economies.
- 2) Agribusiness technology, processing, trade, investment and FDI partnerships with developed countries.
- 3) Agribusiness partnerships in infrastructure, energy and world carbon market.
- 4) Umbrella fund for agribusiness finance and investment in integrated agriculture, agro-industry, infrastructure and energy, drawing on a variety of financial sources.
- 5) Negotiate continental, subregional and national agreements in the above areas.

11.6. Agribusiness knowledge and information sharing

This study has provided valuable new insight into seven key pillars of agribusiness development in Africa. Keeping in mind the rapidly changing global determinants of competitive agribusiness development, it is critical to continuously monitor trends in the field of agricultural supply for agribusiness, productivity, increasing industrial inputs into agriculture, technology, processing, trade, markets, distribu-

tion, logistics, infrastructure, energy and finance. This could provide a basis for new insight for further actions and evidence-based advocacy to key stakeholders in the agribusiness value chain system through research, dialogue, and knowledge and information sharing through publications, expert group meetings, seminars, workshops and websites.

Programme objectives

To gain new insight into opportunities and challenges for accelerating competitive agribusiness value chain development at global, continental, regional and national levels for further knowledge based development and evidence-based advocacy, based on international best practice of relevance to Africa, especially regional value chains.

Indicative projects and actions

- 1) Improve methodology for diagnostic analysis of binding constraints on agribusiness development; and conduct research on contentious policy issues.
- 2) Create knowledge and new global frontiers in agribusiness value chain development of relevance to Africa in terms of value chain integration between farm, industry, trade, technology, innovation, human capabilities, infrastructure, logistics, and energy.
- 3) Improve statistical base for assessing agro-industrial performance, constraints and prospects in Africa.

11.7. Programme governance

This study has argued that an agribusiness value chain strategy represents a potentially important path to wealth creation in Africa. World leaders at the UN General Assembly in September 2010 emphasized that the progress towards meeting the MDGs fell far short of what is needed to meet the deadline set for halving extreme poverty by 2015, especially, though not only, in Africa. Improving governance and honoring commitments made in global aid is urgently needed.

Programme objectives

To facilitate efficient overall coordination and implementation of the programme framework with key actors in different parts of the agribusiness value chain in Africa and globally, and mobilize aid cooperation with multilateral organizations, bilateral development agencies, private agribusiness enterprises and other key players in developed and emerging economies for Africa's prosperity.

Indicative projects and actions

- 1) Set up overall national/regional coordination and implementation framework, to include the lead agencies as decided in the Abuja Declaration: African Union Commission (AUC) and AfDB together with their United Nations partners, UNIDO, FAO, IFAD and UNECA.
- 2) Mobilize financial and technical resources and cooperate with bilateral development agencies in developed and emerging economies for enhanced programme coordination with multilateral aid for agribusiness development.

- 3) Mobilize other actors and establish partnerships with private agribusiness enterprises, technology institutions, research organizations, financial agencies and other actors in developed countries and emerging economies.
- 4) Develop new forms of agribusiness cooperation with China, India, Brazil, Indonesia, Thailand, as well as South Africa, Egypt, Tunisia and other countries.
- 5) Mobilize support from philanthropic sources and relevant civil society organizations in the field of agribusiness development and finance.
- 6) Undertake regular monitoring and evaluation of agribusiness development progress, constraints, prospects, opportunities and growth potential at area, national, subregional and continental levels.

Box 11.1: Summary of agenda for action: Synopsis of programme framework for agribusiness development in Africa

1. Public-private sector dialogue on agribusiness development

- 1.1 Agribusiness fora (subregional)
- 1.2 Agribusiness Value Chain Participant Councils (national)

2. Technical cooperation for agribusiness development

- 2.1 Formulate and implement agribusiness value chain visions, strategies, policies and institutions preparatory assistance in diagnostic analysis of agribusiness resource base, potential for value addition and binding constraints.
- 2.2 Strengthen agricultural supply chain for agro-industrial processing in growth poles and clusters.
- 2.3 Improve industrial supply chain for increasing agricultural productivity and efficient processing.
- 2.4 Assess industrial competitive performance i.a. through the establishment of industrial competitiveness observatory and annual feedback for policy dialogue and response.
- 2.5 Upgrade technology, innovation capacity and human capability, including maximizing spillovers from FDI.
- 2.6 Develop models for SME and agribusiness value chain finance.
- 2.7 Promote agribusiness value chains in rural areas, and cooperatives in selected locations.
- 2.8 Public-private sector dialogue for overcoming infrastructure and energy constraints.
- 2.9 Undertake study tours, provide internships and on the job exposure to best practices.
- 2.10 Foster stronger regional cooperation within Africa in the above areas.

3. Aid for trade for agribusiness exports

- 3.1 Building capacity to trade in agribusiness products.
- 3.2 Strengthening standards and compliance systems.
- 3.3 Enhance national trade facilitation institutions to increase exports.
4. Global agribusiness partnerships
 - 4.1 Partnerships in agribusiness technology, mechanization, innovation, trade, investment and FDI with rapidly growing emerging economies.
 - 4.2 Agribusiness technology, processing, trade, investment and FDI partnerships with developed countries.
 - 4.3 Agribusiness partnerships in infrastructure, energy and world carbon market.

4.4 Umbrella fund for agribusiness investment in integrated agriculture, agro-industry, infrastructure and energy, drawing on a variety of financial sources.

4.5 To negotiate continental, subregional and national agreements in the above areas.

5. Agribusiness knowledge and information sharing

5.1 Improve methodology for diagnostic analysis of binding constraints on agribusiness development.

5.2 Conduct research on contentious policy issues.

5.3 Create knowledge and new global frontiers in agribusiness value chain development of relevance to Africa (integration between farm, industry, trade, technology, innovation, human capabilities, infrastructure, logistics and energy).

5.4 Improve statistical base for assessing agro-industrial performance, constraints and prospects in Africa.

6. Programme governance

6.1 Set up overall national/regional coordination and implementation framework, to include the lead agencies as decided in the Abuja Declaration: AUC and AfDB, together with their UN partners, UNIDO, FAO, IFAD and ECA.

6.2 Mobilize financial aid and technical resources, and cooperate with bilateral development agencies in developed and emerging economies for enhanced programme coordination with multilateral aid for agribusiness development.

6.3 Mobilize other actors and establish partnerships with private agribusiness enterprises, technology institutions, research organizations, financial agencies and other actors in developed countries and emerging economies.

6.4 Develop new forms of agribusiness cooperation with China, India, Brazil, Indonesia, Thailand as well as South Africa, Egypt, Tunisia and other countries.

6.5 Mobilize support from philanthropic sources and relevant civil society organizations in the field of agribusiness development and finance.

6.6 Undertake regular monitoring and evaluation of agribusiness development progress, constraints, prospects, opportunities and growth potential at area, national, subregional and continental levels.

Annex

Annex 1: Value added (% of total GDP)												
	Simple averages						Weighted averages					
	2002	2003	2004	2005	2006	2007	2002	2003	2004	2005	2006	2007
	Industry											
Africa	27.9	28.11	29.22	30.12	31.8	31.98	33.43	33.97	35.03	36.1	33.83	33.45
East	18.36	18.29	18.82	18.34	18.18	18.93	17.31	17.42	17.85	17.58	17.61	18.01
West	20.99	21.59	21.99	22.79	25.58	26.15	27.49	31	34.65	35.97	36.29	35.31
Central	44.3	45.43	50.63	53.95	54.71	49.97	44.38	44.56	48.79	51.8	52.42	48.27
North	32.1	32.04	33.87	35.37	34.06	33.31	36.68	37.58	38.71	40.13	34.05	32.6
Southern	35.87	35.55	35.56	36.42	38.13	38.82	34.96	33.8	33.34	34.1	34.73	35.18
	Agriculture											
Africa	26.41	26.65	25.61	25.33	23.27	21.98	18.19	17.84	16.56	15.83	16.33	15.01
East	31.38	31.57	31.4	31.68	30.47	27.49	36.64	36.53	36.67	36.99	36.99	32.21
West	35.73	36.48	34.75	34.95	31.03	30.73	40.13	37.4	31.81	31.17	30.15	30.38
Central	22.43	21.73	19.35	18.14	17.98	18.69	17.38	16.79	14.99	13.79	13.88	14.09
North	20.19	20.41	19.21	17.58	17.26	16.08	15.88	16.05	15.15	13.87	15.59	14.2
Southern	14.67	14.86	14.58	14.32	13.78	13.5	6.26	5.92	5.56	5.22	4.96	5.13
	Services											
Africa	45.46	45.24	45.17	44.51	44.78	45.94	48.33	48.19	48.41	48.07	49.84	51.53
East	49.32	50.14	49.79	49.98	50.8	53.18	45.6	46.04	45.48	45.43	45.4	49.75
West	43.27	41.94	43.26	42.11	43.39	43.09	32.37	31.6	33.53	32.83	33.56	34.31
Central	33.28	32.84	30.02	27.91	27.3	31.34	38.24	38.65	36.22	34.41	33.7	37.64
North	47.71	47.55	46.92	47.05	48.68	50.62	47.44	46.37	46.14	45.99	50.36	53.2
Southern	49.46	49.59	49.86	49.26	48.09	47.68	58.79	60.29	61.1	60.68	60.31	59.69
	Manufacturing											
Africa	10.77	10.74	10.57	10.33	10.35	10.73	14.22	13.75	13.32	12.92	13.35	13.58
East	8.73	8.52	8.59	8.26	8.02	8.43	8.67	8.57	8.56	8.44	8.25	8.81
West	8.49	8.51	8.65	8.73	7.94	7.53	7.24	6.8	6.56	6.36	5.77	5.39
Central	8.93	8.81	8.04	7.8	7.97	9.22	12.46	12.32	11.32	10.54	10.64	11.72
North	12.78	12.33	12	11.56	12.24	12.68	15.38	14.6	14.18	13.71	15.66	15.84
Southern	15.79	16.2	15.79	15.32	15.79	15.85	17.66	17.54	17.09	16.63	16.36	16.28

Source: World Development Indicators (WDI)/UNECA (2009)

Annex 2: Leading exporting countries of unprocessed, semi-processed and processed food

Panel A: Leading exporting countries of unprocessed food exported for processing					
1990-95			2003-2008		
Country	Average value of export \$ billion	Share of world export (%)	Country	Average value of export \$ billion	Share of world export (%)
United States	17.6	28.8	United States	27.6	24.6
France	8.2	13.3	Brazil	10.3	9.2
Canada	5.6	9.1	France	9.1	8.1
Brazil	2.5	4.1	Canada	8.7	7.8
Germany	2.4	3.9	Argentina	6.6	5.9
China	2.3	3.8	Germany	4.5	4.0
Argentina	2.3	3.8	Australia	4.3	3.9
Australia	2.1	3.5	China	2.9	2.6
Netherlands	1.6	2.7	Netherlands	2.6	2.3
Colombia	1.5	2.5	Russian Fed.	2.1	1.9
United Kingdom	1.4	2.3	Ukraine	1.9	1.7
Belgium-Luxembourg	1.0	1.7	Côte d'Ivoire	1.8	1.6
Thailand	0.9	1.5	Belgium	1.7	1.5
Mexico	0.9	1.4	Colombia	1.5	1.4
Indonesia	0.8	1.3	Hungary	1.5	1.3
Denmark	0.6	1.0	Viet Nam	1.4	1.2
Spain	0.5	0.8	India	1.3	1.2
Turkey	0.4	0.7	Indonesia	1.3	1.1
India	0.4	0.6	Spain	1.1	1.0
Italy	0.4	0.6	Mexico	1.0	0.9
Guatemala	0.4	0.6	Italy	1.0	0.9
Hungary	0.4	0.6	Paraguay	1.0	0.9
Malaysia	0.3	0.5	United Kingdom	1.0	0.9
Greece	0.3	0.5	Kazakhstan	0.8	0.7
Costa Rica	0.3	0.5	Ghana	0.8	0.7
Total of above	55.1	90.0	Total of above	97.5	87.2
Average world export	61.2		Average world export	111.9	

Source: UNCTAD (2010a)

Panel B: Leading exporting countries of semi-processed food exported for further processing					
1990-95			2003-2008		
Country	Average value of export \$ billion	Share of world export (%)	Country	Average value of export \$ billion	Share of world export (%)
United States	4.5	10.8	Malaysia	10.1	10.2
Netherlands	3.7	8.9	Argentina	8.7	8.7
Malaysia	3.4	8.2	Netherlands	8.2	8.3
Brazil	3.2	7.8	Brazil	7.9	8.0
Germany	2.7	6.5	Indonesia	7.9	8.0
France	2.6	6.1	United States	7.9	8.0
Argentina	2.2	5.3	Germany	5.2	5.2
Belgium-Luxembourg	1.6	3.8	France	4.2	4.2
Australia	1.4	3.3	Belgium	3.3	3.4
Indonesia	1.1	2.6	Canada	2.8	2.8
United Kingdom	1.0	2.5	India	2.0	2.0
Canada	0.9	2.2	United Kingdom	1.7	1.7
China	0.9	2.2	Thailand	1.6	1.6
Thailand	0.9	2.1	China	1.6	1.6
Italy	0.9	2.1	Peru	1.4	1.4
India	0.7	1.7	Denmark	1.4	1.4
Philippines	0.7	1.6	Turkey	1.4	1.4
Peru	0.6	1.5	Spain	1.4	1.4
Chile	0.6	1.5	Italy	1.3	1.3
Turkey	0.6	1.5	Australia	1.0	1.0
Denmark	0.6	1.4	Chile	0.9	0.9
Singapore	0.6	1.4	Poland	0.9	0.9
Spain	0.4	1.0	Philippines	0.9	0.9
Mauritius	0.4	0.9	Singapore	0.7	0.7
Japan	0.3	0.7	Côte d'Ivoire	0.6	0.6
Total of above	36.4	87.7	Total of above	84.8	85.6
Average world export	41.5		Average world export	99.0	

Source: UNCTAD (2010a)

Panel C: Leading exporting countries of processed food destined for final use					
1990-95			2003-2008		
Country	Average value of export \$ billion	Share of world export (%)	Country	Average value of export \$ billion	Share of world export (%)
Netherlands	10.1	10.8	Germany	20.2	9.1
France	9.5	10.1	Netherlands	16.0	7.2
Germany	7.8	8.4	France	14.9	6.7
United States	6.7	7.2	United States	14.1	6.4
Belgium-Luxembourg	5.9	6.3	Italy	13.2	6.0
Italy	5.6	6.0	Belgium	13.0	5.9
Denmark	4.0	4.3	China	11.9	5.4
Thailand	3.9	4.2	Thailand	9.9	4.5
Ireland	3.5	3.8	Spain	8.7	3.9
United Kingdom	3.4	3.6	United Kingdom	6.1	2.8
Spain	2.8	2.9	Denmark	6.0	2.7
China	2.5	2.7	Canada	5.9	2.7
Brazil	2.1	2.2	Brazil	5.8	2.6
New Zealand	1.7	1.9	New Zealand	5.1	2.3
Argentina	1.5	1.6	Ireland	4.9	2.2
Canada	1.4	1.5	Poland	4.3	1.9
Australia	1.4	1.5	Argentina	3.0	1.3
Switzerland	1.3	1.4	Australia	3.0	1.3
Greece	1.2	1.3	Austria	2.9	1.3
Hong Kong	0.9	1.0	India	2.9	1.3
Turkey	0.9	0.9	Turkey	2.6	1.2
Japan	0.9	0.9	Switzerland	2.5	1.1
Rep. of Korea	0.8	0.8	Mexico	2.4	1.1
India	0.7	0.7	Viet Nam	2.2	1.0
Singapore	0.7	0.7	Ukraine	2.1	1.0
Total of above	81.0	86.7	Total of above	183.5	82.9
Average world export	93.4		Average world export	221.2	

Source: UNCTAD (2010a)

Annex 3: Leading exporting countries of unprocessed, semi-processed and processed textiles

Panel D: Leading exporting countries of unprocessed textiles exported for processing					
1990-95			2003-2008		
Country	Average value of export \$ billion	Share of world export (%)	Country	Average value of export \$ billion	Share of world export (%)
Australia	2.92	24.5	United States	4.68	30.0
United States	2.87	24.1	Australia	2.43	15.6
New Zealand	0.63	5.3	India	0.83	5.3
China	0.45	3.8	Brazil	0.48	3.1
Pakistan	0.35	2.9	Germany	0.45	2.9
Belgium-Luxembourg	0.32	2.7	New Zealand	0.45	2.9
Argentina	0.30	2.5	United Kingdom	0.40	2.6
France	0.30	2.5	France	0.37	2.4
Germany	0.28	2.4	Greece	0.35	2.2
United Kingdom	0.27	2.2	Belgium	0.35	2.2
Paraguay	0.23	2.0	Mali	0.27	1.7
Hong Kong	0.23	2.0	Egypt	0.27	1.7
Greece	0.22	1.8	Turkey	0.18	1.2
India	0.17	1.4	Kazakhstan	0.17	1.1
Netherlands	0.14	1.2	Netherlands	0.17	1.1
Egypt	0.14	1.1	Rep. of Korea	0.17	1.1
Turkey	0.13	1.1	Italy	0.16	1.0
Brazil	0.11	1.0	Canada	0.16	1.0
Mexico	0.11	0.9	China	0.15	1.0
Italy	0.11	0.9	Syria	0.15	1.0
Syria	0.10	0.8	South Africa	0.14	0.9
Bangladesh	0.08	0.7	Bangladesh	0.13	0.8
Southern Africa Customs Union	0.08	0.6	Pakistan	0.13	0.8
Uruguay	0.07	0.6	Côte d'Ivoire	0.13	0.8
Benin	0.07	0.6	Burkina Faso	0.13	0.8
Total of above	10.7	89.6	Total of above	13.3	85.3
Average world export	11.9		Average world export	15.6	

Source: UNCTAD (2010a)

Panel E: Leading exporting countries of semi-processed textiles exported for further processing					
1990-95			2003-2008		
Country	Average value of export \$ billion	Share of world export (%)	Country	Average value of export \$ billion	Share of world export (%)
Hong Kong	10.3	9.5	China	32.1	18.8
Germany	9.8	9.1	Italy	13.6	8.0
Italy	9.7	8.9	Hong Kong	12.4	7.3
Rep. of Korea	8.6	7.9	Germany	12.0	7.1
China	7.6	7.0	United States	10.2	6.0
Japan	6.9	6.3	Rep. of Korea	10.2	6.0
France	5.4	5.0	Japan	7.2	4.2
United States	5.1	4.7	France	5.4	3.2
Belgium-Luxembourg	3.9	3.6	India	5.0	2.9
United Kingdom	3.5	3.2	Turkey	4.4	2.6
Pakistan	2.2	2.0	Belgium	4.4	2.6
India	2.0	1.8	Pakistan	3.7	2.2
Netherlands	1.9	1.8	Spain	3.4	2.0
Indonesia	1.9	1.7	Indonesia	3.3	1.9
Switzerland	1.7	1.6	United Kingdom	3.3	1.9
Austria	1.6	1.5	Thailand	2.5	1.5
Spain	1.6	1.4	Netherlands	2.4	1.4
Turkey	1.2	1.1	Czech Republic	1.7	1.0
Thailand	1.2	1.1	Canada	1.5	0.9
Singapore	1.1	1.0	Austria	1.3	0.8
Australia	0.9	0.8	Malaysia	1.3	0.8
Canada	0.9	0.8	Mexico	1.2	0.7
Malaysia	0.7	0.6	Switzerland	1.0	0.6
Brazil	0.6	0.6	Brazil	0.9	0.5
Portugal	0.6	0.6	Portugal	0.9	0.5
Total of above	90.6	83.4	Total of above	145.3	85.3
Average world export	108.6		Average world export	170.3	

Source: UNCTAD (2010a)

Panel F: Leading exporting countries of processed textiles destined for final use					
1990-95			2003-2008		
Country	Average value of export \$ billion	Share of world export (%)	Country	Average value of export \$ billion	Share of world export (%)
Belgium-Luxembourg	2.93	11.0	China	14.2	23.3
China	2.60	9.8	Belgium	3.7	6.1
United States	1.87	7.0	India	3.6	5.9
Germany	1.75	6.6	Germany	3.6	5.9
France	1.32	4.9	United States	3.1	5.1
United Kingdom	1.22	4.6	Turkey	3.0	4.9
India	1.18	4.4	Pakistan	2.9	4.7
Hong Kong	1.10	4.1	France	2.0	3.3
Netherlands	1.07	4.0	Italy	2.0	3.2
Italy	0.83	3.1	Netherlands	1.9	3.1
Rep. of Korea	0.78	2.9	United Kingdom	1.6	2.6
Portugal	0.78	2.9	Rep. of Korea	1.2	2.0
Pakistan	0.63	2.4	Hong Kong	1.2	1.9
Switzerland	0.62	2.3	Mexico	1.1	1.8
Turkey	0.60	2.3	Portugal	1.0	1.7
Japan	0.58	2.2	Spain	0.8	1.4
Austria	0.55	2.1	Canada	0.8	1.3
Indonesia	0.43	1.6	Poland	0.8	1.3
Spain	0.38	1.4	Japan	0.8	1.3
Mexico	0.36	1.3	Thailand	0.7	1.2
Brazil	0.35	1.3	Austria	0.7	1.2
Thailand	0.32	1.2	Switzerland	0.6	1.1
Denmark	0.32	1.2	Czech Rep.	0.6	1.0
Canada	0.26	1.0	Denmark	0.6	0.9
Sweden	0.24	0.9	Sweden	0.5	0.9
Total of above	23.1	86.7	Total of above	53.0	86.9
Average world export	26.6		Average world export	61.0	

Source: UNCTAD (2010a)

Annex 4: Leading exporting countries of horticultural products					
1990-95			2003-2008		
Country	Average value of export \$ billion	Share of world export (%)	Country	Average value of export \$ billion	Share of world export (%)
Netherlands	8.0	18.0	Netherlands	15.3	15.3
United States	4.9	11.0	Spain	10.6	10.6
Spain	4.6	10.2	United States	9.6	9.6
Italy	3.0	6.7	Italy	4.9	4.9
France	2.5	5.6	Mexico	4.8	4.8
Mexico	1.6	3.6	Belgium	4.4	4.4
China	1.5	3.3	China	4.0	4.0
Belgium-Luxembourg	1.3	2.8	France	3.8	3.8
Turkey	1.1	2.3	Germany	2.9	2.9
Chile	0.9	2.0	Canada	2.5	2.5
Germany	0.9	2.0	Turkey	2.3	2.3
Colombia	0.8	1.8	Chile	2.2	2.2
India	0.8	1.7	India	2.2	2.2
Ecuador	0.7	1.6	Ecuador	1.8	1.8
Costa Rica	0.7	1.6	Colombia	1.5	1.5
New Zealand	0.7	1.5	South Africa	1.4	1.4
Denmark	0.7	1.5	Costa Rica	1.3	1.3
Hong Kong	0.6	1.3	Argentina	1.2	1.2
Canada	0.6	1.3	Denmark	1.2	1.2
Argentina	0.5	1.2	New Zealand	1.2	1.2
Israel	0.5	1.2	Brazil	1.0	1.0
Rep. of Korea	0.5	1.1	Viet Nam	0.9	0.9
Australia	0.5	1.0	Australia	0.9	0.9
Greece	0.4	1.0	Poland	0.9	0.9
Singapore	0.4	0.9	Morocco	0.8	0.8
Total of above	38.5	86.1	Total of above	83.5	83.5
Average world export	44.7		Average world export	100.0	

Source: UNCTAD (2010a)

Annex 5: Leading exporting countries of unprocessed, semi-processed and processed leather

Panel G: Leading exporting countries of unprocessed leather exported for processing					
1990-95			2003-2008		
Country	Average value of export \$ billion	Share of world export (%)	Country	Average value of export \$ billion	Share of world export (%)
United States	1.5	27.9	United States	2.0	23.5
France	0.4	7.0	Denmark	0.8	9.8
Denmark	0.4	7.0	Hong Kong	0.8	9.4
Netherlands	0.3	6.1	Australia	0.5	6.2
Australia	0.3	5.8	Canada	0.5	6.2
United Kingdom	0.3	5.2	Finland	0.4	4.8
Canada	0.3	4.8	France	0.4	4.4
Germany	0.3	4.5	Germany	0.3	3.6
New Zealand	0.2	4.2	Netherlands	0.3	3.2
Finland	0.2	3.3	United Kingdom	0.2	2.8
Hong Kong	0.1	2.6	Spain	0.2	2.8
Ireland	0.1	1.9	Italy	0.2	2.0
Belgium-Luxembourg	0.1	1.8	New Zealand	0.2	1.9
Sweden	0.1	1.6	Ireland	0.1	1.3
Spain	0.1	1.5	Mexico	0.1	1.2
Japan	0.1	1.4	South Africa	0.1	1.1
Italy	0.1	1.4	Japan	0.1	1.0
Norway	0.1	1.3	Poland	0.1	1.0
China	0.1	1.3	Russian Fed.	0.1	0.8
Switzerland	0.1	1.0	Belgium	0.1	0.9
Southern African Customs Union	0.1	1.0	Norway	0.1	0.9
Austria	0.03	0.6	Sweden	0.1	0.7
Greece	0.03	0.5	Austria	0.1	0.7
Poland	0.02	0.4	Switzerland	0.05	0.5
Ethiopia	0.02	0.4	Czech Rep.	0.04	0.4
Total of above	5.2	94.5	Total of above	7.6	91.3
Average world export	5.5		Average world export	8.3	

Source: UNCTAD (2010a)

Panel H: Leading exporting countries of processed leather exported for further processing					
1990-95			2003-2008		
Country	Average value of export \$ billion	Share of world export (%)	Country	Average value of export \$ billion	Share of world export (%)
Italy	2.4	19.0	Italy	4.6	19.7
Hong Kong	1.1	8.5	Hong Kong	3.0	13.0
Rep. of Korea	0.9	7.3	Brazil	1.6	7.0
United States	0.8	6.3	China	1.5	6.5
Germany	0.7	5.6	United States	1.1	4.6
Argentina	0.6	5.1	Germany	0.9	3.9
Spain	0.5	3.9	Rep. of Korea	0.9	3.9
United Kingdom	0.5	3.6	Argentina	0.9	3.7
France	0.4	3.4	India	0.7	2.9
Brazil	0.4	3.2	Spain	0.6	2.5
India	0.4	2.8	Austria	0.4	1.8
China	0.3	2.0	France	0.4	1.7
Japan	0.2	1.9	Thailand	0.4	1.6
Australia	0.2	1.7	United Kingdom	0.3	1.4
Pakistan	0.2	1.7	Pakistan	0.3	1.4
Netherlands	0.2	1.6	Australia	0.3	1.3
Austria	0.2	1.5	Uruguay	0.3	1.1
Thailand	0.2	1.3	Kazakhstan	0.2	1.0
Bangladesh	0.2	1.2	Netherlands	0.2	1.0
New Zealand	0.1	1.1	Ukraine	0.2	0.9
Uruguay	0.1	1.0	New Zealand	0.2	0.9
Belgium-Luxembourg	0.1	1.0	Poland	0.2	0.8
Greece	0.1	0.6	Bangladesh	0.2	0.8
Southern Africa Customs Union	0.1	0.6	Nigeria	0.18	0.8
Mexico	0.1	0.5	Russian Fed.	0.16	0.7
Total of above	5.2	94.5	Total of above	7.6	91.3
Average world export	5.5		Average world export	8.3	

Source: UNCTAD (2010a)

Panel I: Leading exporting countries of processed leather exported for final use					
1990-95			2003-2008		
Country	Average value of export \$ billion	Share of world export (%)	Country	Average value of export \$ billion	Share of world export (%)
Italy	0.62	11.9	China	1.5	16.5
India	0.33	6.3	Italy	1.4	14.5
Hong Kong	0.31	6.0	Romania	0.5	4.8
China	0.24	4.6	United States	0.4	4.7
Germany	0.24	4.6	France	0.4	4.7
United States	0.24	4.5	Germany	0.4	4.1
Rep. of Korea	0.20	3.8	Hong Kong	0.4	4.1
Thailand	0.18	3.4	Rep. of Korea	0.4	3.9
Portugal	0.13	2.6	India	0.4	3.9
France	0.10	2.0	Brazil	0.2	2.2
United Kingdom	0.09	1.7	Poland	0.2	2.2
Brazil	0.09	1.7	Tunisia	0.2	2.0
Spain	0.08	1.5	Spain	0.2	2.0
Dominican Rep.	0.08	1.5	Mexico	0.2	2.0
Tunisia	0.08	1.4	Austria	0.2	2.0
Hungary	0.07	1.4	Hungary	0.2	2.0
Argentina	0.07	1.3	Albania	0.1	1.3
Austria	0.07	1.3	Slovakia	0.1	1.1
Romania	0.06	1.2	Croatia	0.1	1.1
Mexico	0.06	1.2	Bulgaria	0.1	1.1
Croatia	0.06	1.1	United Kingdom	0.1	0.9
Colombia	0.05	0.9	Portugal	0.1	0.9
Poland	0.05	0.9	Morocco	0.1	0.9
Japan	0.03	0.6	Slovenia	0.08	0.9
Netherlands	0.03	0.6	Thailand	0.08	0.9
Total of above	3.5	67.7	Total of above	7.9	84.5
Average world export	5.2		Average world export	9.3	

Source: UNCTAD (2010a)

Annex 6: Export and import of fertilizers by region/country, 2005-2008												
	EXPORT						IMPORT					
	Value in \$ billion				Average annual growth rate (%) 2005-2008	2008 share in world exports (%)	Value in \$ billion				Average annual growth rate (%) 2005-2008	2008 share in world exports (%)
	2005	2006	2007	2008			2005	2006	2007	2008		
Africa	1.3	1.4	2.0	4.4	49.0	6.1	1.6	2.1	2.4	4.2	39.3	4.8
Asia	2.1	2.1	5.1	6.7	48.6	9.3	10.0	10.3	13.8	29.3	43.3	33.2
Latin America & Caribbean	0.9	0.9	1.1	2.4	37.1	3.3	5.4	5.8	9.1	17.4	47.9	19.8
EU 15	5.8	6.3	8.1	13.7	33.1	18.8	6.7	7.1	9.2	16.7	35.2	18.8
United States	3.2	3.2	3.7	7.5	32.8	10.4	4.1	3.8	5.4	8.9	29.6	10.1

Source: International Trade Centre (ITC) Trade Map based on COMTRADE Statistics (see <http://www.trademap.org>)

Notes: Fertilizers (2-digit heading of Harmonized Systems 2002 - HS Code 31)

Annex 7: Export and import of insecticides, fungicides and herbicides by region/country, 2005-2008												
	EXPORT						IMPORT					
	Value in \$ billion				Average annual growth rate (%) 2005-2008	2008 share in world exports (%)	Value in \$ billion				Average annual growth rate (%) 2005-2008	2008 share in world exports (%)
	2005	2006	2007	2008			2005	2006	2007	2008		
Africa	0.19	0.17	0.19	0.18	-2.4	0.7	0.8	0.9	1.1	1.3	15.4	5.0
Asia	2.8	2.5	3.1	4.2	14.7	17.1	2.0	2.1	2.4	3.1	16.3	12.4
Latin America & Caribbean	1.0	0.9	1.2	1.8	19.4	7.1	2.4	2.5	3.0	4.3	20.9	17.2
EU 15	8.6	8.9	9.8	13.1	15.0	52.8	6.3	6.1	7.4	8.9	12.7	35.7
United States	1.6	1.9	2.2	2.5	15.2	10.0	0.7	0.7	0.7	0.8	4.6	3.3

Source: International Trade Centre (ITC) Trade Map based on COMTRADE Statistics (see <http://www.trademap.org>)

Notes: Insecticides, fungicides and herbicides (4-digit heading of Harmonized System 2002 - HS Code 3808)

Annex 8: Export and import of agricultural machinery used for soil preparation, harvesting and threshing by region/country, 2005-2008

	EXPORT						IMPORT					
	Value in \$ billion				Average annual growth rate (%) 2005-2008	2008 share in world exports (%)	Value in \$ billion				Average annual growth rate (%) 2005-2008	2008 share in world exports (%)
	2005	2006	2007	2008			2005	2006	2007	2008		
Africa	0.17	0.11	0.20	0.18	1.2	0.2	1.5	2.5	2.5	3.5	33.3	4.4
Asia	3.9	4.4	5.4	7.4	23.6	8.7	1.8	2.0	2.4	3.2	19.8	4.0
Latin America & Caribbean	3.3	3.5	4.0	5.1	16.0	5.9	2.6	2.7	3.3	4.7	22.5	6.0
EU 15	30.4	33.7	42.9	51.8	19.5	60.5	18.1	20.4	26.2	30.8	19.4	38.6
United States	6.9	7.5	8.2	10.0	13.2	11.7	7.5	8.1	6.2	7.8	1.5	9.8

Source: International Trade Centre (ITC) Trade Map based on COMTRADE Statistics (see <http://www.trademap.org>)

Notes: Agricultural machinery (4-digit heading of Harmonized System 2002 - HS Code 8201, 8432, 8433 & 8701)

Annex 9: Export and import of agro-processing machinery by region/country, 2005-2008

	EXPORT						IMPORT					
	Value in \$ billion				Average annual growth rate (%) 2005-2008	2008 share in world exports (%)	Value in \$ billion				Average annual growth rate (%) 2005-2008	2008 share in world exports (%)
	2005	2006	2007	2008			2005	2006	2007	2008		
Africa	0.07	0.08	0.08	0.11	17.7	0.5	0.8	1.1	1.2	1.5	23.9	7.5
Asia	0.8	1.0	1.3	1.7	28.0	7.8	1.6	1.7	1.9	2.2	10.8	10.6
Latin America & Caribbean	0.2	0.3	0.3	0.4	25.8	1.7	1.0	1.2	1.4	2.0	25.1	9.6
EU 15	9.8	11.2	13.6	14.8	14.7	67.6	4.6	4.8	5.6	6.5	12.5	31.5
United States	1.2	1.2	1.4	1.7	10.2	7.6	1.4	1.4	1.5	1.5	3.0	7.2

Source: International Trade Centre (ITC) Trade Map based on COMTRADE Statistics (see <http://www.trademap.org>)

Notes: Agro-processing machinery (4-digit heading of Harmonized System 2002 - HS Code 8434, 8435, 8436, 8437 & 8438)

Annex 10: Export and import of packaging materials by region/country, 2005-2008												
	EXPORT						IMPORT					
	Value in \$ billion				Average annual growth rate (%) 2005-2008	2008 share in world exports (%)	Value in \$ billion				Average annual growth rate (%) 2005-2008	2008 share in world exports (%)
	2005	2006	2007	2008			2005	2006	2007	2008		
Africa	0.5	0.5	0.7	0.7	16.0	1.1	1.0	1.2	1.4	1.8	18.9	2.6
Asia	10.2	11.8	13.2	15.2	14.2	23.1	6.0	6.7	7.3	8.4	11.8	12.4
Latin America & Caribbean	2.6	2.7	3.3	3.3	8.0	5.0	5.1	5.4	5.8	6.0	5.8	9.0
EU 15	19.9	21.8	25.5	27.6	11.4	41.8	19.1	21.0	25.2	27.7	13.2	41.2
United States	5.1	5.7	5.9	5.9	4.6	8.9	6.8	7.6	8.0	8.3	6.9	12.4

Source: International Trade Centre (ITC) Trade Map based on COMTRADE Statistics (see <http://www.trademap.org>)

Notes: Packaging materials (4-digit heading of Harmonized System 2002 - HS Code 3923, 4415, 4819, 6305)

Annex 11: Export and import of transport equipment by region/country, 2005-2008												
	EXPORT						IMPORT					
	Value in \$ billion				Average annual growth rate (%) 2005-2008	2008 share in world exports (%)	Value in \$ billion				Average annual growth rate (%) 2005-2008	2008 share in world exports (%)
	2005	2006	2007	2008			2005	2006	2007	2008		
Africa	1.0	1.6	1.9	2.3	31.2	1.3	4.6	6.6	8.2	11.0	33.7	6.2
Asia	22.7	24.9	31.7	38.9	19.5	21.6	4.9	5.7	6.9	9.6	25.2	5.4
Latin America & Caribbean	11.6	14.0	15.4	14.0	6.5	7.8	9.1	11.1	12.7	15.1	18.5	8.5
EU 15	48.0	55.3	71.0	76.3	16.7	42.5	42.7	46.8	58.7	62.6	13.6	35.3
United States	14.4	16.9	19.4	18.8	9.3	10.5	21.7	22.9	23.1	15.1	-11.3	8.5

Source: International Trade Centre (ITC) Trade Map based on COMTRADE Statistics (see <http://www.trademap.org>)

Notes: Transport equipment (4-digit heading of Harmonized System 2002 - HS Code 8601-8604, 8606-8609, 8704 & 8716)

Annex 12: Export and import of telecommunication equipment by region/ country, 2005-2008												
	EXPORT						IMPORT					
	Value in \$ billion				Average annual growth rate (%) 2005- 2008	2008 share in world exp- orts (%)	Value in \$ billion				Average annual growth rate (%) 2005- 2008	2008 share in world exp- orts (%)
	2005	2006	2007	2008			2005	2006	2007	2008		
Africa	2.2	2.6	2.7	4.4	25.5	0.7	9.1	11.5	12.1	17.2	23.7	2.6
Asia	220.7	260.5	298.6	324.0	13.7	51.8	130.1	154.4	170.2	180.6	11.5	27.7
Latin America & Caribbean	26.1	28.8	26.1	34.5	9.8	5.5	30.3	39.8	37.7	54.1	21.3	8.3
EU 15	142.1	176.0	139.0	134.4	-1.8	21.5	145.6	170.0	168.2	166.6	4.6	25.5
United States	38.4	42.8	45.7	48.1	7.8	7.7	92.6	98.9	102.2	106.2	4.7	16.3

Source: International Trade Centre (ITC) Trade Map based on COMTRADE Statistics
(see <http://www.trademap.org>)

Notes: Telecommunication equipment (4-digit heading of Harmonized System 2002 - HS Code 8517, 8518, 8520, 8525-8527, 8529, 8530, 8540, 8544, 9001 & 9014)

Annex 13: Infrastructure by region				
Category/Year	Sub-Saharan Africa	South Asia	Latin America & Caribbean	East Asia & Pacific
Paved roads (% of total roads): 2000-07	11.9	56.9	22.0	34.3
Electric power consumption (kWh per capita): 2007	550	482	1,866	1,883
Energy use (kg of oil equivalent per capita): 2007	662	484	1,273	1,295
Percentage of rural population with access to improved water: 2006	46	84	73	81
Fixed-line telephones (per 100 people): 2008	2	3	19	22
Mobile cellular subscriptions (per 100 people): 2008	33	33	80	53
Internet users (per 100 people): 2008	6.5	4.7	28.9	19.4

Source: World Bank (2010b)

Annex 14: Cost of infrastructure services in sub-Saharan Africa compared with other developing regions		
Service cost	Sub-Saharan Africa	Other developing regions
Power tariffs (\$ per kilowatt-hour)	0.02-0.46	0.05-0.10
Water tariffs (\$ per cubic meter)	0.86-6.56	0.03-0.60
Road freight tariffs (\$ per ton-kilometre)	0.04-0.14	0.01-0.04
Mobile telephony (\$ per basket per month)	2.60-21.00	9.90
International telephony (\$ per 3-minute call to the United States)	0.44-12.50	2.00
Internet dial-up service (\$ per month)	6.70-148.00	11.00

Source: Foster and Briceño-Garmendia (2010)

Note: Prices for telephony and Internet service for other developing regions represent prices for all developing regions, including Africa

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In recent years a renewed focus on agriculture has been evident in policy and development agendas for the African continent; yet little knowledge has been generated on the inter-linkages of production, agro-industry and markets, as well as the potential and capacities for developing these.

Agribusiness for Africa's Prosperity analyses the challenges, the potential and opportunities of African agribusiness in the current period of dramatic changes in global agro-industrial markets, and builds a case for agribusiness development as a path to Africa's prosperity. Written by international experts, from agribusiness practitioners, to academic experts and UN technical agencies, the book fills what UNIDO perceived as a significant gap in knowledge concerning these issues. It will be an important resource for policymakers, agribusiness managers, and researchers in agribusiness development.

The book is composed of three parts: *Part A: African agribusiness: Retrospects and prospects in a global setting* outlines the current status of agribusiness and agro-industrial activities in Africa, and situates them in historical and global context. It analyzes the opportunities for diversified growth provided by agribusiness development, along with the key determinants for fostering agro-industrial value chain development. It assesses the existing and potential sources of demand growth and the main constraints to agribusiness development in Africa.

The chapters constituting *Part B: The seven core pillars of agribusiness development in Africa* analyze each development pillar in detail, assessing possibilities and challenges and providing a range of strategic and policy recommendations, with a view to formulating an agenda for action on agribusiness development. This analysis of the seven pillars is followed by *Part C: An agenda for action*, with a key focus on visions, policies and strategies for Africa's agribusiness development and the way forward towards converting plans into action.

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Editors

Printed in Austria - 2011



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