Natural resource-based industries: Prospects for Africa's agriculture

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1. Introduction

At the same time that China and other emerging markets in Asia are displacing higher cost competitors in manufactured goods and world manufactures export prices are falling, world demand for raw materials, including oil, metals, wood, some agricultural products, and precious stones has been rising since the late nineties, with the rapidly growing economies of Asia (the so-called 'Asian drivers') accounting for much of the growth (Kaplinsky, 2005).

The main premises of this paper are that the prospect of a relatively extended commodity boom can be used to the benefit of raw material rich Sub-Saharan Africa (henceforth, Africa), and that natural-resource based growth can also be sustained in that continent, as has happened elsewhere. To be sure, such a boom is bound to produce only transient benefits unless efforts to increase value-added are undertaken. It is precisely the fact that so many natural-resource rich countries have been unable to upgrade in this sense that has led researchers and policy-makers to promote industrialization in order to avoid the so-called "natural resource curse". In addition, too often primary and resource-based products have been equated to low tech, low R&D because of the limited amount of processing. In fact, many of them are nowadays intensive in knowledge and/or services, and thus can have more value-added than some processed industrial goods.

After making the case for natural resource-based growth in section 2, an overview of Africa's economic structure and quality of integration in world markets for primary and natural resource-based goods, with emphasis on agricultural products (including fisheries) is presented in section 3. Section 4 draws on the experiences of Chile, in Latin America, and Malaysia, in Asia, to show how specialization in primary or natural resource-based products led to sustained economic growth as a result of deliberate actions to create a competitive

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advantage in these products. Section 5 discusses some of the challenges associated with pursuing such a strategy in Africa given its current capabilities, and the contributing factors to success stories, and section 6 concludes.

2. Making the case for natural resource-based growth

The Chilean experience shows that it is possible to sustain high export and GDP growth rates specializing in natural-resource-based high-value exports, including mining and agricultural products. In Africa, Botswana has managed to escape the natural resource curse, achieving high growth rates boosted by diamond exports. Agriculture also played an important role in the industrialization processes of Malaysia and Thailand.

While no one disputes the success stories of natural resource-based growth mentioned above, and many of the positive characteristics associated with non- traditional primary goods are acknowledged in the literature making the case for industrialization as a condition for sustained growth and competitiveness, this tends to be done to illustrate "the exception confirming the rule". The fact that rapid economic growth in East and South-East Asia has been based largely on the development of manufacturing for both domestic and export markets, and that specialization in natural resource-based sectors has produced far less satisfactory results in Latin America has been used as evidence supporting this notion (see, for instance, Lall, Albaladejo and Moreira, 2004). More broadly, it is widely held that natural resource-based sectors exhibit lower productivity growth, are less dynamic in international trade and encompass fewer linkages with the rest of the economy, thus having lower multiplier effects. In addition, expansion of the manufacturing sector is viewed to go hand in hand with the development of educational systems and modern institutions and legal structures, as well as new skills and attitudes that contribute to socio-economic development (Lall, 2005).

A growing body of literature suggests that this does not always hold. At the very least, we hope to convince the reader that specialization in manufacturing is not a necessary condition for sustained economic growth by examining critically the principal misconceptions entertained about natural resources and natural resource-based growth. At this point, we would also like to point out that the distributive consequences of such a development pattern are only addressed marginally in this chapter.

The inverse correlation between per capita GDP growth and abundance of (dependence on) natural resources has come to be known as the "resource curse" hypothesis (Sachs and Warner, 1999). The "resource curse" regularity has been used to argue that countries should focus on manufacturing for their economic development, although evidence on the underlying causes of the relationship is fairly weak. For instance, in this literature, it is implicitly assumed that resource reliance is a measure of development failure, while it could be a result of building upon a country's comparative advantage. Resource reliance does not simply reflect a country's exogenous natural

endowment, but it is also a function of endogenous efforts to make natural resources economically relevant (Stijns, 2005).

More broadly, while in many countries the discovery of natural resources has led to conflicts, and/or very little of the significant rents have been used to invest in people or infrastructure, elsewhere the same discovery has been a "blessing" rather than a curse, as economies have flourished building on the income generated by natural resource exports. In Sweden and Finland, for instance, the knowledge and networks established by the thriving forestry sector were instrumental in eventually making these countries highly competitive in a range of high tech products and in helping to keep the forestry sector itself competitive in face of lower cost producers such as Chile, Brazil and some Eastern European countries (Ferranti et al., 2002). Attributing growth failures to resource endowments hence seems far-fetched and suggests that the underlying causes of growth failures lie within the realm of policy choice (Wright, 2001). Sala-i-Martin and Subramanian (2003) find that once "institutions are controlled for there is either very little effect of natural resources on growth or even a positive effect". This is in line with Acemoglu and Johnson's (2003) finding – based on a cross-section of developing countries – that institutions constraining government and elite expropriation have a large positive effect on investment rates and long-run economic growth.

"Dutch disease" effects are argued to be one of the causes of the "resource curse", but in fact there are various examples suggesting that commodity booms do not necessarily stall economic growth provided rents are managed adequately. In Norway, after the discovery of oil in the North Sea in 1969, economic growth accelerated for the following 25 years, allowing the country to catch-up and then exceed its otherwise highly similar Scandinavian neighbours, Denmark and Sweden, in terms of GDP per capita (Larsen, 2005). In Botswana, reliance on diamond exports has contributed to a notable economic performance, both in relation to the region's average GDP growth, but also in relation to other regions, including East Asia. Between 1965 and 1998, PPP adjusted GDP per capita grew at 8 per cent annually and in 1998 it was four times the average for Africa (Acemoglu, Johnson and Robinson, 2003). Key government initiatives included the establishment of a revenue stabilization and public debt service fund in 1972 (whereby windfall earnings are invested in foreign assets to avoid exchange rate pressure and the interest generated is an important part of government revenues), and implementation of National Development Plans, which determine public expenditure and are voted into force by the Parliament (ODI, 2006).

By another contention, natural-resource based sectors exhibit relatively slow (total factor) productivity growth. As productivity growth is the main determinant of economic growth in the long run, structural change away from primary production towards manufacturing is assumed to be a precon-

dition for sustained economic growth. The dearth of comparable productivity estimates for manufacturing and non-manufacturing sectors has contributed to this being accepted as matter of fact. There is however a growing body of evidence suggesting that the opposite is true. Productivity growth has been shown to be higher in the agricultural sector than in manufacturing, in both developed and developing countries (table 1). In addition, convergence in agricultural productivity across countries appears to be relatively rapid (Martin and Mitra, 2001). One cause of concern is relatively low agricultural TFP growth in Africa, which by one estimate grew by approximately one-fifth of the growth rate in Asia (Coelli and Rao, 2003).

For a set of 14 OECD countries during the 1970-1987 period, Bernard and Jones (1996) estimate that total factor productivity growth was on average highest in agriculture, but negative in mining. Evidence for petroleum, coal and copper extraction in the United States, however, shows that while multi-factor productivity growth was indeed negative for these activities during the 1970s, it has improved significantly since then, as a result of restructuring of the industry but also significant technological developments and improvements in handling systems.[1] In fact, over the longer term, the costs of extraction of many minerals have declined substantially, despite the need to exploit lower grade and more remote and hard to process deposits (Tilton and Landsberg, 1997).

With respect to agriculture, reliance on a finite factor of production (land) means that there is a ceiling on how much can be planted (even considering that significant improvements in yields can be achieved through technological innovations and infrastructure investments). Also, the percentage of household income spent on food decreases as incomes grow. This would (and indeed generally does) translate into lower average growth rates for the agricultural sector than for the non-agricultural sector, and to the decreasing share of agriculture in GDP as a country becomes more developed. This well established empirical regularity does not, however, tell us anything with respect to the contribution of the agricultural sector[2] to economic growth in terms of spillover effects (Bravo-Ortega and Lederman, 2005b).

Research drawing on social accounting matrices (SAM) – which consider both intermediate and final demand across sectors – suggests that the declining share of agriculture in national production is in fact due to the agricultural sector's strong multiplier effects on the rest of the economy, contrary to what the early literature on linkages suggested. Even at the lowest levels of development, where linkages from intermediate demand are weak, expenditures on non-tradable goods and services from rural households following an increase in agricultural incomes – final demand linkages – are substantial (Vogel, 1994). This is in line with Bravo-Ortega and Lederman's (2005b) econometric results, which show a significant positive effect from growth in the agricultural sector to the rest of the economy in developing countries,

whereas the contribution of the non-agricultural sector's growth to the agricultural sector is found to be negative or not statistically significant across regions. In their model, the impact of agriculture on other sectors depends on which dominates: (a) the resource-pull effect (for a sector to grow it needs factors of production that are in fixed supply in the short-run), or (b) positive externalities associated with productivity gains. These positive externalities can arise from the direct demand stimulus associated with technological improvements or from indirect effects (e.g. release of labour and capital from agriculture to other sectors; increased demand for non-agricultural products). The empirical analysis suggests that the second effect dominates in developing countries, whereas the opposite is true in developed countries.

By contrast, the empirical record for extractive industries suggests that linkages with the rest of the economy in developing countries are relatively poor.[3]

Yet another reason why agriculture and other natural resource-based sectors are said to lead to stalled economic growth is that they exhibit declining terms of trade. However, although increases in prices in the 2000-2004 period have been transitory for some commodities and increased supply has since brought prices down[4], overall it seems that primary and resource-based products may not be under as much relative price pressure as traditionally assumed, given the effect of mainly China's (but also India's) growing presence in world markets as net importers of many of those goods and net exporters of many manufactures (Kaplinsky and Paulino, 2004). Using Lall's (2000) classification, Kaplinsky and Paulino find that while high tech sectors have been relatively immune to price pressure, both low tech and engineering sectors have been affected by falling unit prices to a greater extent than resource-intensive sectors.

Cashin and McDermott (2002) find a downward long-run trend in real commodity prices over the period 1862-1999, but they argue that because the trend is small (one per cent annual decline) and totally dominated by the variability in prices, it is of little practical policy relevance.

While high price volatility does pose a challenge for commodity-reliant countries, and the prospects for commodity prices remain uncertain in the short to medium run, growth in demand in Asia will at the very least provide space for developing countries expanding their commodity exports in volume terms. WTO (2005) data for the volume of exports of agricultural products and fuel & mining products show an annual average growth rate of 3.6 per cent between 1990 and 2004, compared to 1.6 per cent and 0.9 per cent, respectively, between 1980 and 1990. While manufacturing exports remain the fastest growing sector in real terms (6.3 per cent between 1990 and 2004; 5.7 per cent between 1980 and 1990), the gap has been reduced.

On the other hand, it seems increasingly likely that the development of low-tech manufacturing sectors in Africa will be stymied by competition from Asia, especially from China. Hence, it may well be that, for Africa,

"industrial development will be a relatively less attractive development option in the short- to medium-run" (Kaplinsky and Morris, 2006, p.33).

Below we address the related issue of innovation cum knowledge intensity in primary and natural resource-based sectors. Kaplinsky and Paulino's (2004) analysis of unit value trends across sectors of varying "innovation content" shows that there is no straightforward correlation between the two, with the exception of goods within the "high tech excluding engineering" category. However, as the authors themselves remark, using unit values as indicators of innovation intensity, and thus competitiveness, implicitly assumes that cost-reducing technical change/innovation is neutral across sectors. While primary sectors are not included in their analysis, there is a significant amount of evidence that increased productivity in primary sectors has steeply reduced production costs for many commodities even as prices were declining.

Lall, Weiss and Zhang (2006) classify products according to "sophistication", inferring product characteristics from the characteristics of the exporter rather than from the technology content of the parent industry.[5] They find that, while there is a link between sophistication and technological depth at the extremes, there is no clear relation otherwise. For instance, electronic products (classified as high-tech) have a lower sophistication score than all of the goods in medium technology categories, suggesting production relocation towards low wage countries. In addition, and more significant from our point of view, is the fact that many resource-based products do not conform at all to the assumption that high sophistication is synonymous with technological depth. While in some cases (e.g. tobacco, dairy products) a low-tech/high-sophistication combination is due to significant trade barriers, in other cases, such as essential oils, perfumes and flavours, but also chocolates and cheese, such a combination reflects product differentiation achieved through branding and specialized skills. The same is true for the (on average) low-tech fashion cluster, which includes a number of very "sophisticated" products, from special textile fabrics to lace and embroidery, which are skill and knowledge intensive.

We disagree however with these authors' view that "primary exports do not raise significant issues on technology" (p.224). Significant trade in fresh agricultural produce, for instance, is a relatively new phenomenon, intrinsically related to innovations in inputs (e.g. improved seeds and feed), post-harvest/slaughter (e.g. irradiation and temperature treatments; animal traceability; packing and labelling), logistics (transport and distribution systems) and in the use of specialized skills (e.g. in the introduction and adaptation of new varieties/species to local conditions). For many of these export products, embedded knowledge and service content are inversely related to the degree of processing (e.g. fresh fruits versus canned fruits). Among developing countries, trade in high-value agricultural products is concentrated in the richest among them (Jaffe, 1998; VEK-World Bank, 2004; UN-ECLAC, 2005).

Within dynamic global value chains (see next section), differentiated products such as organic fruits and vegetables, or free range poultry, obtain premium prices, but even in relatively stagnant commodities one increasingly observes processes of differentiation and value-addition. Premium coffees, for instance, are virtually insulated from what happens in the conventional coffee market, reaping prices up to six times higher (Kaplinsky, 2004). In Argentina, a specific classification for the corn variety Flint was introduced in 1997, effectively segmenting the market. Until then, the two main varieties of corn in Argentina (hybrid of US origin and Flint) were both classified as tipo duro, coloured. While hybrids improved productivity, average quality was reduced. The segmentation of the market has thus allowed Argentina to enter markets demanding a specific quality level (Brooks and Lucatelli, 2004). In the food industry, numerous new products and brands are brought to market every year. Packaging and branding allow for horizontal differentiation, while higher quality and service content (e.g. ready to cook meals) permit vertical differentiation (Brooks and Lucatelli, 2004).

In minerals, more sophisticated surveying techniques, improved extraction technologies and other innovations can "expand a country's resource base, effectively creating new natural resources from an economic standpoint" (Watkins, 2006, p.510).

Commodities are commonly conceived as products with low barriers to entry (Kaplinsky and Paulino, 2004). Innovating in production/extraction processes and in marketing and distribution raises such barriers; indeed, many primary products offer significant opportunities for upgrading.

In conclusion, there is substantial evidence supporting our view that specialization in primary and/or natural resource-based goods has the potential to lead to sustained economic growth. Nevertheless, while such a pattern of specialization is not necessarily a curse, it has been one in practice in many developing countries, among which African countries figure prominently.

3. Quality of Africa's insertion in world markets

In this section, we look at the depth and quality of Africa's insertion in world markets for primary and natural resource-based products, with emphasis on the agricultural sector (including fisheries). Recent papers have addressed at length the opportunities for Africa's mineral sector and discussed the institutional set-ups that might improve resource rent management (e.g. ODI, 2006). Whereas in a number of net fuel and mineral exporters, these products are likely to remain dominant features of the economy, a large number of African countries are dependent on agriculture for both GDP and exports. While on average the agricultural sector accounts for 20 per cent of GDP, in some LDCs this percentage reaches 50 per cent. Overall, agricultural exports (including raw materials and processed foods) represent half of total merchandise exports from African countries, exceeding 80 per cent in some.[6] Furthermore, over 30 per cent of the African population depends on agricul-

ture for their livelihood, but this share reaches 95 per cent in some of the poorest regions (European Commission, 2005).

3.1 Dynamic primary products and resource-based manufactures

Goods for which demand is growing relatively fast offer opportunities for export growth. These dynamic products typically include (but do not necessarily coincide with) differentiated products which command higher prices than standardized ones. UNCTAD has authored a number of publications on this subject. In the 2002 Trade and Development Report, for instance, it finds that "primary products and resource-based manufactures have steadily lost shares over the past several decades", while "non-resource based manufactures have been driving export growth" (p.143). Aggregating products into categories conceals variations at the product level. Furthermore, increased participation of developing countries in high-tech exports has been highly concentrated in East Asia and, until recently, largely relied on the technologically simpler, more labour intensive processes.

Here we replicate the UNCTAD exercise using recent data to capture the emergence of the so-called Asian drivers and their significant impact on the demand for raw materials and natural resource-based goods. We use Lall's (2000) SITC Rev.2 commodity categories for technological content[7] but highlight the dynamics of products within the primary and resource-based categories over the 1990-2004 period. All data are from UN-COMTRADE. Import values were used to estimate world trade, which includes intra-EU trade. COMTRADE reports trade volumes only for a small number of products (basically, primary commodities). The analysis is thus exclusively based on nominal trade values.

Based on average (compounded) annual growth rates, we find that the 50 per cent fastest growing products (at the 4-digit level) in world trade (i.e. with growth rates above the median, 5.3 per cent) accounted for 84 per cent of total world imports in 2004. Medium & high tech goods accounted for roughly 60 per cent of world trade in dynamic products thus defined (34 per cent and 26 per cent, respectively), primary goods for 14 per cent, resource-based goods for 11 per cent and low tech goods for the remaining 14 per cent.

In a further refinement, we created a group of "highly dynamic" products, which in addition to exhibiting average annual growth rates above the median, also increased their share in total world trade in the period under consideration (this means in effect growing above the average for total world trade, 7.1 per cent). "Highly dynamic" products represent roughly only one-fifth of the total number of products at the 4-digit level but accounted for almost two-thirds of world trade as of 2004. While at the aggregate level only high-tech goods have gained market share over the period under considera-

tion, we find that, in addition to mineral fuels, a few other primary products and roughly one-fifth of natural resource-based manufactures are highly dynamic. True, non-fuel highly dynamic primary commodities represent a very small share of world trade (0.5 per cent), and resource-based commodities account for only around 6 per cent (figure 1). Still, goods with very different unit values are being compared and it is noteworthy, for instance, that imports of (fresh or chilled) fish fillets[8], within primary goods, or of palm oil, within resource-based manufactures, have grown faster than many goods in the manufacturing sector, increasing their respective market shares in world trade by 75 per cent and 84 per cent, respectively, between 1990 and 2004.

Table 2 provides an illustrative list of the "dynamic"/"highly dynamic" agricultural goods under the primary and resource-based categories.

Between 1980 and 2000 Africa had a generally poor performance as far as world market share in more technologically sophisticated manufactured products is concerned, the two exceptions being South Africa and Mauritius. African resource-based manufactures and primary products increased their share of world trade. Among the former, however, only mineral-based manufactures increased their shares and, among the latter, most growth was explained by oil exports (Lall, 2005).

Although there is an improvement in world market shares for African low- and medium-tech manufactures when comparing 2004 to 1990, our estimates based on UN-COMTRADE data indicate that, as of 2004, African exports (mirrored by world imports) still accounted for a very small fraction of world trade in manufactures (0.1 per cent, 0.5 per cent and 0.6 per cent of world trade in high-tech, medium-tech and low-tech manufactures, respectively; 2.0 per cent of world trade in NR-based manufactures). The only category where Africa has an important world market share is in primary products (6.7 per cent), although without South Africa the market share drops to 5.5 per cent, largely on account of that country's significant share in the non-fuel primary mineral products category.

A more detailed analysis based on the definition of "dynamic" products adopted earlier reveals further insights into the pattern of specialization in Africa. While its share of dynamic primary products is relatively high (7.3 per cent) – actually growing by 0.1 percentage points over the 1990-2004, this is largely accounted for by high growth in demand for fuels. Its market share is relatively high in the case of fuels and other minerals (8.2 per cent and 6.5 per cent, respectively), and only 2.3 per cent in the case of dynamic agricultural goods.

Africa's share of world trade in dynamic natural resource-based manufactures, on the other hand, is small and stagnant (at 1.8 per cent), and its share in dynamic agro-based manufactures trade, which includes many goods for which demand is elastic and/or with high unit value, is growing but still incipient (0.6 per cent in 2004 vs. 0.4 per cent in 1990).[9] One important driver of this pattern of specialization is increased demand from Asia, espe-

cially from China. In 2004, China accounted for roughly 9 per cent of Africa's exports, up from 1 per cent in 1995. Minerals and forestry products account for the lion's share of Africa's exports to China (Goldstein et al., 2006).

As shown below, Africa is a major exporter of "typical" primary commodities, of which only cocoa is a dynamic one, but it has been increasing its market share, sometimes very significantly, for some dynamic, high unit value agricultural products. Unfortunately, exports of products in the latter group are still very small and concentrated in a handful of countries, and processes of value-addition and differentiation in traditional export sectors have been limited.

3.2 Traditional agricultural export products

Africa's agricultural exports are concentrated in a few commodities – including coffee, tea, raw cane sugar, cocoa, and cotton. Africa is the largest producer of cocoa beans (about 70 per cent of world production on average in the 2000-2004 period, representing a 25 per cent increase in volume terms over the 1980-2004 period) and has relatively significant shares in world production of green coffee (13 per cent), bananas (10 per cent), cotton (9 per cent) and sugar cane (6 per cent) (European Commission, 2005). Most exports go to countries outside the region. The European Union is Africa's most important trade partner by far in agricultural goods (table 3).

Production has increased for all of these products with the exception of coffee, which happens to be one of the most valuable export commodities where Africa has traditionally been a major player in world markets. As of 2004, Africa's green coffee production stood at 80 per cent of its 1980 level. The main determinants of this decline are increasing competition from exporters in Latin America (Brazil, Colombia) and East Asia (Vietnam) and stagnant productivity – while farm yields in the rest of the world increase (European Commission, 2005) (see box 1).

One alternative to the commodity coffee market is to focus on market niches such as organic or specialty coffee. The ability to enter these profitable markets presents significant challenges for producing countries, including the fact they are relatively small in terms of traded volumes and that they require substantial investments in developing certification bodies (Rodrigues and Torres, 2003). Foreign organic production systems are typically not recognized in developed country markets, and thus organic products must be re-certified in order to be sold as such, entailing significant costs (see Garcia and Bañados, 2004, for Chile; Gómez et al., 2005, for Mexico; Basu and Grote, 2006, for China). Still, the market for organic produce is growing fast. Expansion is likely to be enhanced as large retailers like Wal-Mart enter this market segment.[10]

Ghana and the Ivory Coast remain by far the world's largest producers of cocoa. Indonesia and Brazil are the largest producers outside of Africa.[11]

Other (significant) producing countries in Africa include Cameroon, Gabon, Nigeria and Togo. Cocoa production in Indonesia has undergone significant expansion since the early eighties, increasing by a factor of 20 between 81/82 and 96/97. The expansion programme was encouraged by a number of factors, including government grants to buy land and incorporation of planting technology and husbandry used in Malaysian plantations (ICCO, 2005 and 2003). Between 1970 and 1997, Africa's market share in cocoa is estimated to have fallen by 20 per cent in favour of Asia, which saw its share rise by roughly the same proportion (Iyoha, 2005).

Box 1

In Viet Nam, as a result of reforms undertaken since 1986[12], the area cultivated with coffee grew at a phenomenal rate over the following decade and production expanded commensurably, making Vietnam the third largest world coffee producer (Minot, 1998). Most coffee grown in Vietnam is of the lower quality, lower cost Robusta variety which is mainly used in instant coffee and blends. In Africa, half of total production consists of Robusta coffee (Uganda and Ivory Coast being the main producers in the region) and the remainder the higher quality, higher price Arabica variety. The most important sources of Arabica coffee in Africa are Ethiopia and Kenya. The latter thus compete more directly with Colombia and Brazil (where Arabica coffee accounts for 100 per cent and 80 per cent of total coffee bean production respectively). While Arabica prices typically exceed Robusta prices by 50 per cent, oversupply in the coffee market has affected both, and demand for the latter has been growing faster (e.g. as a result of growing demand for espresso, which requires fewer coffee beans per serving and more robusta to increase the caffeine "kick"). New technologies have also contributed to widening the use of the Robusta variety (Scholer, 2004).

Global consumption of cocoa has been increasing steadily. Africa has an important market share in the world's main consuming markets, including the EU and the United States, but also in China. In 2004, cocoa bean imports from Africa accounted for 94 per cent, 59 per cent and 68 per cent, of these countries' imports, respectively. African cocoa powder exports also hold an important market share in extra-EU imports, although imports of cocoa powder are only a fraction (3 per cent) of imports of cocoa beans, as most of the grinding takes place within the EU.[13]

One interesting development in the Ivory Coast has been the increase in its share of cocoa grinding (leading to its becoming the world's third largest processing country since 1998/99, after the Netherlands and the United States). According to ICCO (2005), this "has partly resulted from govern-

ment policies geared towards exporting value-added semi-finished products rather than raw cocoa beans, triggering substantial investments in cocoa processing capacity at origin by multinational companies" (p.13). At the same time, however, dismantlement of the cocoa parastatal marketing board in the early nineties, major policy errors (including withholding cocoa from the market in the late eighties in the face of growing competition from Asia), combined with more recent political turmoil have been accompanied by a steep reduction in the share of high quality cocoa beans. In Ghana, for the time being, effective operation of the cocoa state marketing board has kept production up to high quality standards (Kaplinsky, 2004). In addition to quality, low yields are a problem. A small cocoa farm in the Ivory Coast produces an average of 450 kg per hectare (ha) and in Ghana 300 kg/ha, whereas yields reach 1500 kg/ha in Indonesia. Government intervention (including the distribution of seedlings of the high yielding variety) was instrumental in the expansion of production, yields and participation of smallholders in Indonesia[14] (ICCO, 2003 and 2000).

Sugar is a stagnant commodity largely as a result of oversupply due to protectionism in OECD countries. Sugar's world market prices are, together with cotton, some of the most distorted. In fact, despite the fact that the cost of producing sugar from cane is approximately half the cost of producing it from beets, in 2000 27 per cent of the world's sugar came from beets, which are almost entirely produced in the EU, the United States, Japan and Eastern Europe (Mitchell, 2004). Although the EU is the second largest net exporter of sugar[15] (after Brazil, the most competitive producer in the world) as a result of import protection and export subsidies, it provides trade preferences to some ACP countries under the Sugar Protocol and an associated agreement (Mauritius being the largest beneficiary) and to LDCs under the Everything But Arms (EBA) initiative[16]. As of 2004, Africa's share of extra-EU raw sugar imports reached 53 per cent.[17] While some LDCs, such as Ethiopia and Mozambique, have been able to develop their sugar sector as a result of these preferences, overall imports from African LDCs are insignificant compared to the EU's total sugar consumption, which remains largely supplied by domestic producers (Oxfam, 2004).

The reform of the EU sugar regime (which came into force on 1 July 2006, cutting production and internal prices, but maintaining tariffs on imports) will affect different African producers differently. All countries currently benefiting from preferential treatment in the EU will be negatively affected to a certain extent, with the highest impact being felt in Mauritius (as it currently enjoys a large quota and has high production costs). Other countries, including Malawi, Mozambique, Swaziland, Zambia and Zimbabwe, are among the most competitive producers in the world and will probably withstand the ensuing fall in EU import prices. South Africa, the largest producer in Africa and seventh in the world, on the other hand, does not currently benefit from preferential treatment in the EU. If, as expected,

EU sugar exports fall as a result of the reform, new world market space would be created and South Africa, as well as other competitive producers in the continent, could potentially occupy that space, depending on their ability to compete with Brazil (Malzbender, 2003).

Production of sugar as an intermediate input to the regional biofuel industry could represent an alternative for African sugar cane growers (as happens already in Brazil) and simultaneously help reduce dependence on imported fossil fuels (most African countries are net importers of oil). Mauritius, for instance, is already looking at developing its bioethanol industry. In addition, the expansion of demand for sugar/ethanol in the EU and US markets (as a result of both regulation and market driven incentives to increase biofuels' share in total fuel consumption) could become an opportunity for upgrading in the African sugar sector as well. MFN duties applied to bioethanol are steep in both the EU and the US, but African countries (with the exception of South Africa) do not pay duties in the EU (Teixeira Coelho, 2005). Among ACP countries, Swaziland and Zimbabwe are the leading exporters. The only LDC supplying the EU with bioethanol, albeit in a highly erratic manner, has been the Democratic Republic of the Congo (European Commission, 2006).

As of 2004, EU *banana* imports were managed under a tariff-quota regime which benefited African producers to the detriment of Latin American producers. Still, the latter remain the EU's main suppliers. African exports held a 14 per cent market share as of 2004.[18] Following an agreement reached with the US and Ecuador in 2001, the EU committed to a transition to a tariff-only import system starting in January 2006. It has now put in place a dual system where an import tariff of 176 euros per metric ton on bananas is imposed on MFN suppliers, and ACP countries are allowed to export duty-free under an annual import quota of 775,000 tons.[19] A re-examination of the internal aspects of the Common Market Organisation (CMO) that regulates aid to European banana producers is now being undertaken and is due to be released this summer (European Commission, 2006). Duty phase-out under EBA for bananas took place in January 2006, which could potentially benefit African LDCs. Still, one should note that the two largest African exporters (Ivory Coast and Cameroon) are not LDCs and that yields (according to FAOSTAT) are well below those prevailing in the largest EU suppliers (Ecuador and Costa Rica).

Consumption of *cotton* has been on an expansion track since 1998 in both developed and developing countries. Among the latter, China has been a significant driver, as it is the largest world cotton producer but also a net importer. This has resulted from a combination of declining relative prices with respect to other textile fibres, population increase and rising per capita incomes, and the gradual integration of quota categories into WTO rules preceding the end of the Multi-fibre Arrangement (ICAC, 2004). As of 2004, Africa accounted for 20 per cent of China's imports of cotton (up from

18 per cent in 1990). It was furthermore an important external cotton supplier of the EU, with a market share of 26 per cent as of 2004.[20] Expansion of production in francophone (western) Africa is a result of significant improvements in yields enabled by public and semi-public support for research, input supply, production, processing, and marketing. This region is now the second largest exporter of cotton in the world (after the US) – whereas its world market share was close to zero after independence (Gabre-Madhin and Haggblade, 2004; ICAC, 2004). Nevertheless, important challenges remain (see box 2).

Box 2

The West African countries which produce low-cost high quality cotton have been unable to benefit fully from this boom, as world prices are artificially low due to oversupply of subsidized US cotton. While China, India and Pakistan are also major producers, only the United States is in addition a major exporter. Africa's cotton exports to the US accounted for less than 0.5 per cent of the total supplied to that market in 2004.[21] At the Hong Kong WTO Ministerial it was decided that developed countries would eliminate all forms of export subsidies to cotton in 2006. Since most cotton producers in Africa are smallholders, this could have a significant impact on rural incomes and rural poverty. At the same time, although there is in principle scope for developing a textile industry and producing goods with more value added, high energy and transportation costs remain a challenge. In Mali, for instance, the purchases of cotton by the nascent local textile industry have to be subsidized by the local ginning company (Goldstein et. al, 2006). Diversification towards products with more value added is particularly important as new competitors enter the market. Although Brazil has traditionally been a net importer of cotton, the introduction of the new high yielding Bt variety has turned the country into a net exporter as of 2003/04 and this change is likely to be sustained (ICAC, 2004; Oxfam, 2002). As of 2005/2006, yields were higher only in Australia[22].

In summary, with the exception of cotton, African producers of traditional agricultural commodities have steadily been losing market share to Asian and Latin American competitors over the last two decades. This holds even for cocoa, where the Ivory Coast remains a dominant supplier. Stagnant yields and inability to improve the price/quality ratio stand in stark contrast with trends in competing countries.

3.3 Fresh and simply processed high-value agricultural exports

In this section, we look at Africa's current insertion in selected world markets for fresh and simply processed high value agricultural products. This group

consists of those defined as high unit value and/or high income elasticity of demand foods in Mayer, Butkevicius and Kadri (2002) – meat and meat products, dairy products, vegetables fruits and nuts (fresh, preserved and prepared), spices, and fixed vegetable oils and fats – plus dynamic inedible ornamentals (live plants and bulbs; cut flowers and foliage). Like fresh fruits and vegetables, the latter are perishable, high value-to-volume ratio products.[23] Products at the 5-digit SITC Rev.2 level are considered.

The EU is by far Africa's main market for its high value agricultural exports, accounting for almost three-fourths of the total. The second largest importers globally, Japan and the US, account for only 5 per cent each, followed closely by India. China is still a small market for African exports of this type of products, but its significance as a destination for Africa's exports has increased the most over the 1990-2004 period, and, in contrast to India, African countries have actually gained market share in China for these type of products (with potential for further growth; see section 5). The same holds for the US (where Africa's market share doubled) and the EU (where Africa's market share increased by 2.7 percentage points). Africa lost market share in Japan (table 4).

The two largest import markets globally are taken into consideration for more disaggregated analysis below: the EU (15) and the United States. Combined, these economies accounted for almost half of world imports of high value agricultural products in 2004 (table 4). Imports from Africa accounted for 12 per cent and 1 per cent, respectively, of those countries' total imports of high value agricultural products in 2004 – a proportional increase in market shares with respect to 1990 of 30 per cent and 83 per cent (table 5).

In the United States, Africa is still an incipient supplier (or not an exporter at all) in many product categories. Still, imports of high value agricultural products as a group from Africa have grown at a significantly faster rate than imports of these products from the world. Moreover, for certain products, Africa is already a large supplier. High value agricultural import categories where Africa is a relatively important supplier (at least 5 per cent market share) include: vanilla (76 per cent) and cloves (49 per cent); oranges (44 per cent); raisins (15 per cent); edible nuts nes[24] (15 per cent); mandarins (14 per cent); mixtures of fruit or vegetable juices (7 per cent); flours of leguminous vegetables, fruits, roots and tubers (7 per cent). Market shares grew in all cases, in some instances from zero in 1990. Very large market share increases (although often from a low base) have taken place in several product categories, including: frozen fish fillets, oranges, some juices and cut foliage (table 5).

In the US market, the main competition (for the products where Africa has a market share of 5 per cent or more) comes from developing countries in Latin America and from China, but also from developed countries (e.g. Australia and Spain in the case of oranges and mandarins, respectively) (table 6).

Most importantly in terms of scale, Africa has a significant (above 10 per cent) and increasing market share of the (extra) EU market in a relatively large number of product categories (see table 6). Amongst these products, the highest market shares are achieved, in descending order, by: cut flowers (53 per cent), oranges (43 per cent), grapes (41 per cent), fresh or chilled fish fillets (36 per cent) and pears (34 per cent). In one important category, fresh or chilled vegetables nes (all vegetables excluding leguminous, tomatoes and alliaceous vegetables), Africa's market share has remained stagnant at 22 per cent. Africa also has a considerable market share in the EU's imports of fresh apples (18 per cent), several tropical fruits (fresh and processed) (e.g. 38 per cent in the case of pineapples), spices (55 per cent in the case of both vanilla and cloves) and peanut oil (31 per cent), but it has lost market share in these markets.

The largest world suppliers in each selected market and Africa's suppliers for each product category are contrasted in table 6. Some stylized facts emerge. First, there is a high source-country concentration for these products (the combined market shares of the two largest competitors account for between 54 per cent and 66 per cent on average in the markets considered). Secondly, only two countries consistently appear among the two largest suppliers across product categories, Kenya (for fresh vegetables and cut flowers) and South Africa (citrus, apples, grapes, pears and quinces, stone fruit nes, prepared or preserved fruits and nuts, nes). In addition, these countries stand out in that they are suppliers of a diverse set of both fresh and slightly processed fruits and vegetables. Thirdly, only a handful of LDCs appear at all as suppliers of high value agricultural products (e.g. Uganda and Tanzania, in the case of fresh fish fillets; Mozambique and Malawi, in the case of nuts; Madagascar and Comoros in the case of vanilla and cloves; Zambia in the case of vegetables). Finally, and on a more positive note, non LDC countries such as Zimbabwe and Swaziland are emerging as growing suppliers of vegetables, fruits and flowers, while Botswana and Namibia are important suppliers of beef in the EU market and a few countries in West Africa (Ivory Coast, Ghana, Cameroon), are still among the leading suppliers of the European market for tropical fruits as well as producing for the local processing industry – although faced with increasing competition from Latin American producers.

Africa is either totally absent as a supplier or has a market share below 1 per cent for most meats (notably, the most dynamic ones in world trade, such as fresh poultry and pork), dairy products, eggs, and most vegetable oils (the exception being the least dynamic among them, peanut oil, of which the LDCs Senegal and Gambia are large exporters – see table 6).

While some of these products face steep competition from established, large supplying countries (Malaysia and Indonesia for palm/palm kernel oil; Argentina and Brazil for soybean oil), very high SPS barriers (meats, dairy), and/or high protectionism (dairy products), the same applies to a certain

extent to other products where Africa has increased its market share significantly. For example, although African exports of products such as fish fillets or cut flowers benefit from preferential market access in both the EU and the US, they also face steep SPS barriers, suggesting that a process of upgrading has occurred. As discussed in section 5, this is indeed the case.

4. Successful agricultural-based growth: policy lessons from Asia and Latin America

This section reviews the experiences of Chile, in Latin America, and Malaysia, in Asia, in achieving sustained agricultural-based growth, with special reference to the role of the public sector in this process.

4.1. Lessons from Chile

While copper is the single most important source of foreign exchange and foreign investment, the agricultural sector (including fisheries and forestry) is a significant contributor to GDP, exports and employment in Chile – a contribution that substantially increases when backward and forward linkages are taken into consideration (Ferranti et al., 2005).

Chile's exports of high value agricultural products are concentrated in fish, wine and fresh fruits. Chile is the largest world exporter of fresh grapes (31 per cent world market share as of 2004) and fresh or chilled fish fillets (21 per cent). It is also the second largest exporter of avocados (19 per cent; Mexico is the first). In other fruits, it is still a relatively small player, but its market shares have consistently increased (e.g. berries). Finally, Chile is the fifth largest exporter of wine, with a 5 per cent world market share.[25]

While Chile does enjoy a comparative advantage in the production of agricultural products, as a result of relatively low fixed costs and counter-seasonal production (with respect to the northern hemisphere), its success in international markets is ultimately rooted in the ability to acquire competitiveness in new market niches and sectors, by upgrading both processes ("transforming inputs to outputs more efficiently by reorganization of the production system or introducing superior technology and process upgrading") and products ("moving into more sophisticated product lines in terms of increased unit values") (Giuliani, Pietrobelli, and Rabelotti, 2005, p. 552). We discuss key determinants using the berries and salmon sectors as illustrations.

Berries

Chilean fresh fruit exports are intensive in technology and services, as a result of the use of advanced technologies at different production stages, including computerized irrigation, modern selection procedures and packaging systems, controlled atmosphere storage and air-conditioned transport, to name but a few. The use of such technologies is both cost-saving and allows for better quality control, thus introducing an element of differentiation at

the international level. Hence it is not uncommon that Chilean fruits appear under the country brand in OECD food retailers (Brooks and Lucatelli, 2004). The emergence of Chile as an important world producer of berries is just one example among many of how the country has excelled in diversifying its primary exports towards higher value-added products. As of 2004, Chile was the fifth largest exporter of fresh raspberries, blackberries and the like, with 8 per cent of world market share, and the second largest exporter (after Serbia and Montenegro) of frozen berries (excluding strawberries), with 21 per cent of world market share. The US and the EU are the main markets for these products.[26]

Below, we draw extensively on Guaipatín (2004) to show how early public investments in knowledge and infrastructure were instrumental in the development of this dynamic cluster already in the seventies. Increased exports of non traditional agricultural products took place much later elsewhere in the region (David, Dirven and Volgelgesang, 2000). To this day, the Chilean agricultural sector remains a recipient of important public investments in irrigation infrastructure, targeted credit and technical assistance programmes for small farmers, and sanitary and phytosanitary programmes. According to the most recent estimates available for public expenditures in the agricultural sector, Chile spends a considerable amount per person employed in the sector (almost US$500 in 2001, more than double the amount spent in 1990, compared to an average in Latin America of US$250[27]) (Kjöllerström, forthcoming).

In the late sixties, CORFO, a public development agency, instituted a programme for the development of the fruit sector ("*Plan Frutícola*") which included public investments in R&D, post-harvest infrastructure, overseas market research, soft credit lines for investments in infrastructure and working capital, and tax incentives for fruit exporters. This induced the development of specialized training programmes in the University of Chile (UC) and the National Institute for Agricultural Research (INIA). A cooperation agreement signed with the University of California allowed students of the UC to acquire state-of-the-art knowledge in fruticulture. At the same time, INIA attracted the most competent researchers offering competitive salaries and started a research programme focused on the sector (whereby, for instance, fruit varieties adapted to local conditions were developed). In summary, the *Plan Frutícola* created the necessary mass of human capital that was pivotal in the successful transfer and adaptation of foreign technology, which improved fruit production and post-harvest, and also the infrastructure required for exports of highly perishable products. Despite its elimination following the 1973 coup, the basis for private sector participation had been laid, as both risk and initial investment requirements were substantially reduced.

The take-off of fruit exports in the seventies was driven by large companies, which benefited from a duty drawback system for non traditional exports and the devaluation of the exchange rate. A large portion of the spe-

cialists that had worked under direct or indirect financing of the Plan went on to work for these companies, and the remainder were encouraged to find private financing for their research, which meant that it became very much demand driven. In 1975, Prochile, a government agency for the promotion of exports was founded, offering credit to groups of medium to large producers. INIA similarly started an agricultural extension and technology transfer programme targeting groups of large producers in the early eighties. The fact that groups of producers were targeted stimulated horizontal cooperation, ultimately leading to the creation of important private sector associations which exist to this day, such as Fepach[28] and Fedefruta. These private sector associations are today central elements of the dynamic fruit cluster. Fepach plays a prominent role in the berries niche, monitoring the adoption of good agricultural and manufacturing practices[29], negotiating better prices for international freights and production inputs, and providing market intelligence to its members.

Because of high barriers to entry (related to quality requirements and to complex logistics), the marketing of fresh raspberries is dominated by four companies and tends to be vertically integrated from the production stage, while in the case of frozen raspberries, which have lower value-added but also lower entry barriers, over 45 companies operate. Small farms are virtually excluded from the former but participate extensively in the latter, accounting today for half of the area cultivated with raspberries – from virtually zero in the beginning of the nineties. Overall, the sector makes a significant contribution to employment, as production is labour-intensive (e.g. 90 per cent of the harvest is done manually).

Both the private and public sectors contributed to increasing small producer participation in the frozen raspberry value chain. INDAP (an agency of the Ministry of Agriculture) and INIA started providing credit and agricultural extension services to small producers in the beginning of the nineties. INDAP initiated a supplier development programme for small fruit producers which included capacity building in the adoption of good agricultural practices. Large producing/exporting companies have played a significant role in this process, as the need to lower variable costs and increase flexibility in supply led them to contracting out production to small farms, becoming in the process one of the main sources of credit, inputs and technical assistance in order to keep quality under control.

Salmon[30]

From virtually zero exports in the early eighties, Chile is today the second largest world salmon producer after Norway. Salmon exports accounted for 9 per cent of total exports excluding the mining sector (5 per cent of overall exports) as of 2005. Productivity (measured by kilos of fish per kilo of feed) is estimated to have more than doubled over this period[31] and is now similar to Norway's. While in 1991 fish flour still accounted for 42 per cent of total exports of fish and fish products and salmon for only 14 per cent, by

2005 these shares were 16 per cent and 56 per cent, respectively. In addition, value-added salmon products (fresh and frozen fillets being the most important) have increased their share in the total cluster exports from 23 per cent in 1994 to 67 per cent in 2005. Fresh salmon fillets, like fresh berries, are transported by air (mainly to the US), and face highly stringent sanitary requirements, while frozen fillets are transported by sea, the EU and Japan being the two main markets. While salmon is a relatively homogeneous product with low value added, salmon fillets command premium prices.[32] The investment requirements of the salmon sector have led to the development of a number of supplying industries, including, among others: manufacture of fish farming cages and nets; construction of floating warehouses; manufacture of feed, vaccines and antibiotics; transportation; infrastructure maintenance services; quality monitoring services; and insurance (Association of Chilean Salmon Industries, SalmonChile, http://www.salmonchile.cl). In addition to being an important contributor to exports, GDP and employment, the development of the salmon cluster is considered to have had a significant impact in reducing poverty in Chile's main salmon producing region (Los Lagos, 1000 km south of Santiago, the capital), which dropped from 40 per cent in 1990 to 24 per cent in 2000 (Montero, 2004).

The Chilean government (through agencies like the Agriculture and Livestock Service, SAG) started to survey areas with potential for salmon farming already in the mid-sixties, with the support of international cooperation. For instance, the Japanese International Cooperation Agency (JICA) supported the introduction of the Coho species in Southern Chile. In the seventies, domestic and foreign companies gradually started to invest in the business following the establishment of the first commercial salmon operation in the country, with funding from CORFO and the leadership of *Fundación Chile*[33], which showed that this could be a profitable activity. In the nineties, joint actions led by the private sector and supported by public agencies, such as the allocation of public funds for R&D and technological upgrading, and more recently, the promotion of Chilean salmon abroad, have contributed to the strengthening of the cluster (Giuliani, Pietrobelli, and Rabelotti, 2005; Montero, 2004).

A stable macroeconomic, investment-friendly environment contributed to attract foreign direct investment. Although foreign firms played only an incipient role in the development of the cluster, they have increased their presence among large exporters and have facilitated the introduction of new technologies such as automated fishing and fish-counting systems (UNCTAD, 2006).

Fundación Chile continues to be an important contributor to innovation in the industry. Just recently, it has developed an automatic tool for salmon harvesting that increases harvest yields (in terms of usable meat per fish), as well as improving the processing and quality of the fillet's texture.[34] A number of public and private universities are nowadays developing new technolo-

gies and training professionals for the sector. Many of these projects are also co-funded by public funds [e.g. FONDEF – Scientific and Technological Development Fund – in the case of the development of a remote sensing system for seabed cleaning by the University of Concepción (UNCTAD, 2006)].

Throughout this process, government agencies have also had a key regulatory role: in the assignment of coastal concessions to fish farming companies, and in monitoring the sanitary conditions of inputs, output, and infrastructure. In 2000, Chilean authorities decided to introduce restrictions to salmon egg imports. This measure forced the private sector to enter the business of roe production, leading to a high degree of self-sufficiency (Chile produces 80 per cent of its needs), improved yields and reduced incidence of diseases and related antibiotic requirements, with an overall positive impact in terms of production costs (Montero, 2004).

Enforcement of regulation has increasingly been undertaken in partnership with the private sector, one example of such collaboration being the Cleaner Production Agreement signed with the Association of Chilean Salmon Industries (SalmonChile) in 2001. This is an agreement with the government and monitored by SalmonChile, whereby companies in the cluster voluntarily commit to using environmentally friendly processes, recycling and optimizing the use of materials (Iizuka, 2006).

SalmonChile also has an important role in supporting the development of quality standards, overseas marketing, and capacity-building, and in the legal defense against anti-dumping accusations in the WTO between 1997 and 2002. Concerns about increasingly stringent private sector requirements have more recently prompted SalmonChile to develop a local quality, sanitary, social and environmental standard (SiGes – Integrated Management System) that – although in line with international ones[35] – is less cumbersome and costly, allowing domestic companies with certain sustainable management practices in place to gain recognition for those efforts. Simultaneously, these standards function as guidelines towards the adoption of the stricter international standards such as ISO14000. In 2004, under the leadership of SalmonChile, the standards based on SIGes were adopted industry-wide by the Association of American Salmon (SOTA).[36] Thus the Chilean salmon industry has been able to become a standard setter in the salmon industry on the American continent. This illustrates the role of enhancing collective capabilities in the process of upgrading in natural resource-based industries (Iizuka, 2006).

4.2. Lessons from Malaysia

The growth of agro-industry in Malaysia was stimulated by the development of both traditional and export-oriented agriculture. Production and upgrading were encouraged by public specialized agencies, and the fiscal revenue obtained from taxes on the thriving export sector was us ed to reinvest in tar-

geted R&D. Rapid economic growth ensued, *pre-dating* the boom in electronics. In addition to strong evidence that natural resources had a major role in Malaysian and Thai growth, and helped both countries to cope with economic recession following the Asian financial crisis, there is some evidence that rapid expansion of non-resource based exports from the mid-eighties onwards might actually have been "less favourable to the long-run development of these economies than is commonly suggested", due to relatively small learning effects, impacts on technological capabilities and backward linkages (Reinhardt, 2000, p.58).

In fact, the 2006 WTO Trade Policy Review of Malaysia states: "Malaysia's heavy dependence on exports of electronics and electrical goods means that economic growth is vulnerable to global fluctuations in the demand for these products. (…) Malaysia's economic slowdown [following the Asian crisis and up to 2003] highlighted the problems of over-reliance on an export-led growth strategy (…) and the consequent vulnerability to the industrial countries' business cycle" (WTO, 2006, p.1). The Malaysian government has now taken measures to "develop new sources of growth, focusing on agriculture, services and resource-based industries to improve the country's resilience to shocks" (WTO, 2006, p.1).

Below we focus on the determinants of expansion and upgrading of the agricultural sector in Malaysia, and particularly on the development of the palm oil industry, with a view to highlighting the role of public policy in the upgrading of the sector, just as we did for Chile.

Malaysia is currently the world's largest producer and exporter of palm oil – replacing Nigeria as the main producer as early as 1971 (Yusoff, 2006)[37] – accounting for 50 per cent of world output and 58 per cent of world exports as of 2004. Palm oil accounts for over one-third of total value added in the agricultural sector (WTO, 2006).

In the fifties, Malaysia's economy was largely dependent on tin and rubber, which combined accounted for over half of total GDP. With the emergence of synthetic rubber, Malaysian natural rubber exports went through a severe crisis. Recognizing the inadequacy of such a narrow base to sustain economic growth, the government initiated a diversification strategy in the sixties which included initiatives to develop non resource-based manufacturing (including the creation of Export Processing Zones and fiscal incentives to attract FDI) and diversification of the agricultural sector by promoting the palm oil industry. The focus on rural and agricultural development was further justified by the need to address mounting social conflict as a result of high income inequality between the Malay dominated rural areas and the ethnic Chinese dominated urban areas. Because the re-settlement of the rural landless was undertaken in connection with the development of organized smallholder oil palm schemes through government agencies such as FELDA (Federal Land Development Authority), the stage was set for palm oil to play a key role in the diversification of primary exports and ultimately in

Malaysia's rapid economic growth. Large expanses of land cultivated with rubber were converted to oil palm, which went from 55,000 hectares in 1960 to 1 million hectares in 1980, to 2 million hectares in 1990 and 3.4 million hectares as of 2000, a little over half of total agricultural land use. Over one-fourth is cultivated under FELDA schemes. The palm oil industry's share in total agricultural exports increased from a mere 7.7 per cent in 1970 to roughly 30 per cent by the mid-nineties. At the same time, palm oil development made a significant contribution to poverty reduction. As of 1997, poverty rates in agriculture were 11.8 per cent, compared to 68 per cent in 1970 (Simeh and Ahmad, 2001).

In addition to the instrumental role played in converting land to production of a new product for which there was a strong demand in international markets and which could be produced locally at a competitive price, public intervention was key in supporting market development, R&D and a conducive regulatory framework. The Palm Oil Registration and Licensing Authority (PORLA), for instance, undertook licensing and other regulatory activities so as to ensure that declared quality standards were being met. The Palm Oil Research Institute of Malaysia (PORIM), on the other hand, conducted research aimed at improving productivity, value-added and quality in the industry. PORLA and PORIM have been merged and now form the Malaysian Palm Oil Board (MPOB). Finally, the Malaysian Palm Oil Promotion Council (MPOPC) has since 1990 been promoting palm oil overseas, through diverse marketing activities, promotion of joint-ventures and provision of technical support and information to increase consumer knowledge about palm oil. Because the palm oil industry has been so successful, the agricultural sector is now deemed to have become too dependent on the commodity and hence the Malaysian Government now aims at revitalizing the agricultural sector elsewhere and has identified a number of products for purposes of diversification in its Third National Agriculture Policy (1998-2010) (Simeh and Ahmad, 2001).

With the goal of making Malaysia a "competitive global producer of high quality and safe agricultural products that meet international standards", the government is emphasizing the following three broad policy objectives: (i) adoption of modern agricultural methods, including biotechnology, through investments in R&D; (ii) development of Malaysia as a hub for processing, packaging and marketing of agricultural products; and (iii) development of the aquaculture, deep-sea fishing, ornamental fish breeding and halal produce sub-sectors (WTO, 2006).

The main incentives for selected activities in the agricultural sector are: (i) "pioneer status" (5-year partial income tax exemption); (ii) investment tax allowance (5-year allowance of 60 per cent on qualifying capital expenditure), including investments in clearing and preparation of land, planting of crops, construction of access roads including bridges, among others; (iii) incentive packages, including tax exemptions of different degree and relief of

losses in some cases, for companies investing in the production of kenaf,[38] deep-sea fishing, vegetables, fruits, herbs, spices, aquaculture, and the rearing of cattle, goats and sheep; (iv) tax incentives for 'Halal' Food Production[39]; and (v) eligibility of locally-owned manufacturing companies with Malaysian equity of at least 60 per cent and reinvesting in promoted food processing activities (e.g. chocolate, processed fruits and vegetables, essential oils, aquaculture feed, etc) for another round of the Pioneer Status or Investment Tax Allowance (ITA) incentive.[40]

Like Chile in the salmon industry, Malaysia has played a leading role in the development of halal certification, in line with the government's aim of developing the country as a hub for halal products, although it is currently still a small producer. All meat and meat products, poultry, egg and egg products must receive halal certification from the Department of Islamic Development Malaysia (JAKIM). Standards have since 2004 been strengthened through the introduction of new guidelines by the Malaysian Department of Standards, which involve adopting procedures for slaughtering, processing, and other related operations as prescribed by Islamic rules. Each individual product must receive halal certification – rather than the production plant – and the certificate is issued following the joint recommendation of both JAKIM and the Malaysian Department of Veterinary Services based on on-site inspection. The Small and Medium Industries Development Plan (2001-2005) and the Third National Agricultural Policy include additional initiatives for the development of this sub-sector, such as capacity-building in inspection, monitoring and certification of halal standards, and promotion of halal industries through tax incentives such as those just described (WTO, 2006).

Common characteristics of these incentive packages include the fact they are granted for a limited amount of time, and they essentially target new investments in "new" activities (the promoted activities/products[41]). This is in line, at least to a certain extent, with Rodrik's (2004) recommendation that, in order to minimize the risks of perpetuating mistakes and to achieve spillover and demonstration effects, only "new" activities/products not previously produced locally or new technologies applied to "old" products should be given support, which should be limited in time.

At the same time as these other sub-sectors are being promoted, enhanced prospects from use of palm oil as biofuel and the enormous amount of oil palm waste available in the country have led the Malaysian government to target the development of the biofuel industry through a "four prong strategy" defined in the National Biofuel Policy released in August 2005.[42]This includes: (i) the production of a biofuel blend of 5 per cent processed palm oil and 95 per cent diesel; (ii) encouraging the use of this blend among consumers; (iii) establishing an industry standard for palm oil biodiesel quality; and (iv) promoting the establishment of biodiesel plants in Malaysia for export (e.g. through joint-ventures with the MPOB, using MPOB patented

technology). Moreover, the government will be promoting the use of biofuel among government vehicles, through a voluntary scheme (Malaysian Palm Oil Board, 2005). Exports to Europe are reported to have commenced in August 2006, and biodiesel was also to have become available at local pumps in Fall 2006. Thirty-two biodiesel manufacturing licenses (out of a total of 87 applications) had received government approval as of July 2006.[43]

5. Creating competitive advantages in the agricultural sector in Africa

5.1 What products? What policies?

A central thesis stemming from Hausmann and Rodrik's (2003) work on economic development and "self-discovery" is that specialization in primary or natural resource-based products leads to sustained economic growth if this is a result of deliberate actions to build on a comparative advantage and create a competitive advantage in these products, but typically not otherwise.

The view that specialization according to comparative advantage is not a driver for economic growth is supported by empirical work showing that diversification (in terms of value added and employment, and in terms of "new" exports, i.e., products not substantially exported in the beginning of the 1990s but exported in large quantities a decade later) steadily increases with per capita income up to a relatively high threshold, and only then starts to decline (Imbs and Wacziarg, 2003; Klinger and Lederman, 2004). Furthermore, Klinger and Lederman (2004) show that "discovery" (in the sense of episodes when countries start exporting a new product) has occurred at a lower than expected frequency in Sub-Saharan Africa, given its population and income level.[44]

Specializing in traditional primary goods without innovating to increase value-added seems to be a recipe for failure. This is in line with Ferranti et al.'s (2002) paper on developing a knowledge-based economy from a natural resource base by placing emphasis on "how to produce" rather than on "what products"; and also with Bonaglia and Fukasaku (2003, p.9), who argue that low income countries "must use, rather than 'sit on' their natural wealth to build new areas of competitive advantage in non-traditional products". But how do countries (a) discover "new" products or (b) upgrade traditional ones?

Much recent research on the drivers behind the development of dynamic clusters in developing countries has focused on the governance of domestic and external networks (e.g. what firm characteristics determine the propensity to cooperate with others) and participation in global value chains, neglecting the central role played by governments in providing infrastructure, business services, technical upgrading and export assistance to the private sector (Meagher, 2005; for an exception, see Guaipatín, 2004). Finding "new" goods and services that can be supplied cost effectively has sometimes taken place without public intervention (see Jaffe and Gordon, 1998).

However, in many instances, public-private partnerships have been instrumental in starting new activities that later proved to be very profitable, and evolution towards high productivity clusters has often been backed by public interventions aimed at capturing cost-discovery externalities and at solving coordination failures (Rodrik, 2004). A survey of expert opinion concluded that public institutions were key initiators of change leading to success in African agriculture, for example (Gabre-Madhin and Haggblade, 2004). Active government intervention was found to be important in supporting crucial stages of agricultural market development in the Green Revolutions which took place in the 20th century (Dorward et al., 2004).

This is because the process of discovery and upgrading is far from trivial. First, there is uncertainty concerning the true costs of producing a new good or service under local conditions. Investments in new activities with potentially high returns which cannot, however, be fully appropriated by pioneers will be undersupplied, despite the potential to generate significant social benefits. This is particularly relevant in natural resource-based sectors, where uncertainty is particularly high and appropriability low (Giuliani, Pietrobelli, and Rabelotti, 2005). Second, in order to be profitable, many projects require complementary investments in a number of areas, often with high fixed costs which private entrepreneurs would be reluctant to bear. To address the information externalities underlying the first problem, some form of public support to investments in non-traditional activities is typically required. With coordination externalities, on the other hand, public policy can foster coordination of private investments, e.g., through measures like selective loan guarantees, and public investment can provide infrastructure with high social but low private returns (Rodrik, 2004).

The experiences of Chile and Malaysia show how horizontal and vertical diversification has led to successful natural resource-based growth and how public policy has played an important role in this process. Both countries are now large world suppliers of primary and natural resource-based agricultural products for which demand is growing and income-elastic and which are characterized by relatively high unit values. Also, in both cases, the products that eventually became success stories were not produced traditionally; rather, they are "new" products in the sense described above.

5.2 Special challenges and success stories in Africa

The extent to which the best practices reviewed in section 4 can be utilized in the African context to build new areas of competitive advantage within the agricultural sector is constrained by high external barriers and poor domestic capacity to overcome them. The most important of these are discussed below. Key actions in the African countries which have been able to overcome these barriers are highlighted.

While on average tariff protection remains high in developed countries for some agricultural sectors[45], Sub-Saharan Africa faces relatively low tariffs

as a result of preferential treatment received under the Cotonou (ACP) and Everything But Arms (EBA) schemes (EU), the African Growth and Opportunity Act (AGOA) (US) and GSP. For instance, in the EU, African agricultural exports pay an average tariff of 7 per cent, compared to 18 per cent for developing countries of the CAIRNS group. In developed Asian countries, the tariffs applied are 12 per cent and 24 per cent, respectively. In the US the preferential margin is smaller (3 per cent compared to 3.8 per cent, respectively), but the average tariff applied is low. In addition to facing the highest tariffs, South American and Asian countries are also affected by tariff escalation in the EU to a greater extent than African countries (Bureau, Jean and Matthews, 2005).

The average tariff (including ad valorem equivalents for non ad valorem tariffs) imposed on high value agricultural goods – as defined earlier – originating from Africa was 6 per cent and 1 per cent in the EU and the US, respectively. In emerging markets, such as China and India, on the other hand, tariff protection is steep (23 per cent and 37 per cent on average). Averages for Africa, in the case of the EU, are affected by the fact that many African countries are LDCs. The more developed African countries, which are also more competitive in non commodity agricultural exports, benefit from ACP treatment, but not EBA. The average tariff applied to non LDC African countries is 11 per cent, compared to the overall average of 6 per cent[46] (in the US, China and India, the difference is insignificant).

Overall, preferences granted to developing countries seem to be well used for agricultural products. In the US and the EU, only a little over 10 per cent of eligible agricultural products are not imported under a preferential regime and those correspond to small trade flows and/or low MFN tariffs. Trade flows associated to preferential schemes for LDCs are, however, quite modest in relation to the EU and the US's total agricultural imports (0.4 per cent in the case of the EBA initiative and 0.2 per cent in the case of AGOA, for instance) (Bureau, Jean and Matthews, 2005). The inability to leverage these preferences is rooted in poor domestic capabilities to deliver goods complying with increasingly demanding standards.

By one recent estimate, the ad valorem equivalent (AVE) of TRAINS[47] Non-Tariff Barriers[48] (NTBs) is higher than the actual tariff in 57 per cent of the cases when present in a given tariff line. The incidence of NTBs on agricultural goods is particularly high, although manufactured goods are not exempt from them (AVE = 20 per cent and 8 per cent, respectively)[49]. In addition, for roughly one-third of the products subject to domestic agricultural support, the AVE of that support is higher than the tariff (9 per cent on average for products subject to support). Dairy products are the agricultural goods subject to the highest NTBs, as measured by their AVE. Within countries, tariffs tend to increase with both the AVE of NTBs and domestic agricultural support, lending support to the view that NTBs are partly used as protectionist tools (Kee, Nicita and Olarreaga, 2006).

Among the different types of NTBs, technical measures such as Sanitary and Phytosanitary (SPS) and other standards (e.g. related to labelling and packaging) have been gaining prominence over the last 10 years. In 1994, technical measures accounted for 22 per cent of all NTBs applied by developed countries, whereas in 2004 this percentage reached 50 per cent. In developing countries in Asia, which include emerging markets for Africa like China and India, the share of technical measures increased from 24 per cent to 48 per cent. Overall, by one estimate, government mandated testing and certification requirements have experienced a seven-fold increase over this period (UNCTAD, 2005).

SPS measures in developed countries often exceed multilateral norms. For instance, in the EU, maximum allowable residues of aflatoxins in nuts, dried fruits and cereals are more stringent than international standards, with an estimated significant negative impact on imports from Africa (Otsuki, Wilson and Sewadeh, 2001). The 2004 EU Directive on wood packaging material is also more restrictive than what is established in the International Plant Protection Convention (USTR, 2005).

The ITC (2003) estimated that, in 2002, 40 per cent of LDC exports were subject to NTBs, compared to 15 per cent in the case of the exports from other developing and transition economies. Respondents to a survey of low and middle income countries rated SPS standards to be the most important barrier for their agricultural exports to the EU, the most affected products being (fresh and simply processed) meat, fish, fruits and vegetables. While the EU was the market for which SPS requirements were considered to be the most significant impediment to trade, SPS requirements were also deemed problematic in Australia and the United States (Henson and Loader, 2001).

In the EU, imports of *products of animal origin* must comply with two basic requirements. First, the exporting country must be recognized as free of certain diseases (the same holds in the US); and secondly, imports into the EU must have an original health certificate from an approved establishment. Neither the EU nor the US automatically recognizes a country's (or region's) disease-free status determined by the World Organization for Animal Health. The EU also has strict requirements for the use of hormones and other substances such as antibiotics, as well as for maximum allowable residues. Exporting countries are required to have monitoring programmes in place and to submit monitoring results to the EU. Laboratories must comply with EU standards. The monitoring programmes can be limited to products for export, but traceability must be ensured. Establishments exporting meat to the EU must also comply with Directive 93/119/EC on animal welfare. Of 30 countries which responded to a survey undertaken by the European Commission on the subject, only 5 African countries (Botswana, Cape Verde, Namibia, South Africa and Swaziland) have some sort of animal welfare protection rules or industry guidelines.[50] As a result of these restrictions,

and despite substantial preferences, especially for LDCs, in Africa only a handful of countries are allowed to export (some) meat products to the EU (Botswana, Namibia, South Africa, Swaziland, Zimbabwe). No African country is eligible to export fresh meat products to the US.[51]

With the exception of South Africa, these African countries are all beneficiaries of preferential quotas in the EU market under the Cotonou agreement (South Africa's beef does not benefit from preferential treatment under the bilateral trade agreement with the EU either). In Africa, Namibia and Botswana are the largest beef exporters to the EU, although with substantially smaller market shares than highly competitive countries which benefit from less generous preferences, like Brazil and Argentina (table 6). Still, maintaining a presence in the EU market is indicative of the substantial public investments that have been taking place in those African countries in order to meet the stringent requirements outlined above, including in livestock identification and trace back systems and upgraded facilities in slaughterhouses. In Botswana, the beef sector has traditionally been a recipient of considerable direct government support, namely through direct subsidies, tax incentives and provision of livestock-specific infrastructure. Government expenditures in the agricultural sector as a whole have been estimated at over 50 per cent of agricultural GDP, with the expenditures of the Department of Animal Health accounting for approximately half of that in the 2003/2004 budget (Stevens and Kennan, 2005, p.9).

According to Kaplinsky and Readman (2005): "Product upgrading (in design or quality) will be reflected by a relatively good unit price performance (in that either unit prices grow more rapidly or fall less rapidly than those of competitors) and a complementary improvement in (or stability of) market share". Namibia's market share in the EU has grown faster than Botswana's and unit values have also increased more (Stevens and Kennan, 2005). This suggests that product upgrading has occurred in Namibia to a greater extent than in Botswana. Qualitative information supports this assertion. The key determinant of Namibia's success has been the ability to persuade importers of the superior quality of its beef, which is largely a result of the Farm Assured Namibian Meat Scheme (FANMEAT), managed by the government-owned, privately financed Meat Board of Namibia. Under this scheme, both full traceability and strict veterinary and animal welfare standards conforming to EU requirements are ensured. No other comparable scheme exists in Africa today. Although currently most Namibian meat exported to the UK is used in the catering industry, supermarket chains are becoming interested in marketing this meat as well, as it is "hormone free, hygienic and reared according to higher welfare standards" (Bowles et al., 2005, p.785).

While tariffs imposed by developed countries on *fish products* from developing countries are either zero or low, sanitary standards and technical requirements (e.g. with respect to packing and labelling) are important

restrictions to developing country exports. Imports to the EU and the US must have an original health certificate from approved establishments and bear the name of the country of origin. Health and quality standards are based on the stringent HACCP requirements (UNCTAD, 2005a).[52]

Despite these barriers, low-income countries like Uganda and Tanzania were able to respond to increased demand for freshwater fish in the beginning of the nineties and have become important suppliers of an essentially "new" product, fish fillets, which happens to be among the most dynamic commodities in world trade (see section 2) and has a high unit value. Production of fish fillets has stimulated the development of the animal feed sector, which uses fish waste as a main input, as well as the packing and logistics sectors. This required substantial investments in upgrading infrastructure and domestic capabilities. In Uganda, for example, following the EU's 1997 ban on imports of Nile perch[53] from East Africa due to bacterial contamination (followed by a ban in 1999 due to fish poisoning), the Fish Processors and Exporters Association (UFPEA) sought technical assistance from donors and in cooperation with the government established a reliable, EU (and US)-compliant fish safety assurance system. UFPEA members themselves undertook significant investments (Bonaglia and Fukasaku, 2003). Technical assistance from UNIDO (United Nations Industrial Development Organization) seems to have been instrumental in this regard. Essential aspects of its support included: reviewing the organizational aspects of fish inspection; updating regulations to conform with international standards; reinforcement of the capacity of the regulatory and inspection authority, the Department of Fisheries Resources; strengthening the technical support institutions (thereby creating a critical mass of national HACCP (Hazard Analysis and Critical Contro Point) and Good Hygienic Practices specialists/auditors); upgrading the capacity of public laboratories (with equipment and technical assistance); and strengthening the capacity of the private sector at the fishing, landing and processing plant levels (e.g. training of plant staff in Good Hygienic Practices and HACCP).[54] International cooperation in the start-up phase of new activities was also an important aspect of Chile's fruit and salmon sector development (see section 4) and is probably crucial to other low income countries in Africa.

Despite auspicious demand prospects, overexploitation of fisheries stocks could limit the industry's expansion. Development of commercial aquaculture is widely seen as a desirable development that would compensate for the diminishing catch of wild Nile perch, but research on its reproductive biology, spawning habits and growth potential in an artificial environment has received relatively little attention. Uganda's Fisheries Policy includes an aquaculture development plan, but funding remains a challenge (Kaelin and Cowx, 2002).

Because government standards defining quality, size and ripeness vary between markets and change frequently, they constitute a significant barrier to exports of fruits, vegetables and nuts from developing countries.[55] In addition

to strict standards imposed by developed country governments, private standards such as those imposed by supermarkets and global distributors also constitute a barrier to participation in global agricultural markets. In the EU, standards were initially imposed by each supermarket chain on its suppliers of fresh agricultural produce, but this later evolved to a system of protocols defined by the supermarket industry as a whole. These constitute de facto licenses to enter the EU market, and comprise mainly food safety standards, but also environmental (e.g. restricting the use of chemicals) and labour standards in some cases [e.g. the Euro Retailer Produce Working Group (EUREP) Good Agricultural Practice (GAP) guidelines, EUREP-GAP]. In many instances, requirements exceed national norms (VEK-World Bank, 2004).

Investments in quality and food safety assurance systems are key factors underlying Kenya's success as a vegetable exporter. The establishment of a well staffed national plant inspection service (KEPHIS) in 1997 has played a key role in this regard.[56] The Kenya Horticultural Code of Practice – drafted by the Fresh Produce Exporter Association of Kenya (FPEAK) in partnership with the Horticultural Crop Development Authority – is designed to ensure European importers that Kenyan horticultural products are produced in an environmentally- and worker-friendly manner. Although there is no legal enforcement mechanism, it is expected that importers will pressure Kenyan exporters to adopt the code following European certification (Minot and Ngigi, 2003).

Substantial investments in supply control and traceability systems, upgrading of packinghouse facilities (e.g. improved water and sanitation and advanced cold treatment and storage systems), staff training and health counselling, and environmental testing have been undertaken by the leading companies in the fresh produce industry, allowing them "to service the premium-quality end of the market [of British supermarkets], including the growing demand for salads and other semi-prepared vegetable products" (World Bank, p.86). Private investments have been stimulated by a liberal investment regime, fiscal incentives for horticultural exports and political and economic stability (Zhihua Zeng, 2006; Minot and Ngigi, 2003). Overall, and despite the fact that not all exporters have been able to move to the most profitable segment of the market (they keep supplying wholesale and ethnic food markets in Europe), these proactive actions have contributed to increasing the unit value of Kenyan vegetable exports (World Bank, 2005, p.88), similarly to what Namibia achieved for its meat.

In the Ivory Coast, increased competition from Central American and Caribbean fresh pineapple exporters (the country supplied roughly 90 per cent of the European market in the mid-1980s and only two-thirds in 1990) has made the need for upgrading in the industry apparent. The *Office Centrale des Producteurs-Exportateurs d'Ananas et de Bananes* (OCAB) was formed in the nineties to represent the interests of exporters, set quality standards, facilitate communication among stakeholders and organize the char-

tering of reefer ships for transport of bananas and pineapples to Europe. One important action undertaken by this body has been the reduction in the number of approved exporters of fruit in order to maintain quality standards (Minot and Ngigi, 2003). Strategic investments in shipping logistics and other supporting infrastructure have also been undertaken. The development of a real time "bar code" pallet traceability system allows all agents involved in a transaction to trace individual pallets at all times of shipping, while investments financed by EU funds have been used to improve feeder roads and power lines to connect banana and pineapple producing plantations and smallholder clusters to the main road and electrical network (Voisard, 2005). Political instability since 1999 has undermined the potential impact these interventions might have had, and the Ivory Coast has lost further market share in the EU to Costa Rica and Ghana.[57] We will return to the Ghanaian experience below.

While favorable tariff quotas, fast growing demand for high value foods and historical ties have led African countries to focus on the European market, fast growing economies in the developing world, particularly in Asia, with a complementary pattern of specialization, and where less stringent quality requirements prevail, represent an opportunity for market diversification.

China is already driving Africa's pattern of specialization as a result of soaring demand for minerals, as well as cotton and cocoa.[58] Increasing per capita income and urbanization rates will lead to increased demand for feed (e.g. oilseeds), meat and other non-cereal foods (e.g. edible oils, sugar, products from aquaculture, fresh fruits and vegetables) and therefore might become an interesting market for Africa's exports of high value foods in the near future (Mayer and Fajarnes, 2005; Goldstein et al., 2006). In fact, Africa has started to supply the Chinese market with live plants, frozen fish fillets, lemons and limes, edible nuts, and grapefruit juice, and it has significantly increased its market share in dried fish and crustaceans, albeit from a very low base.[59]

Increased concentration of purchasers in global value chains only adds to the difficulties faced by potential suppliers in developing countries. A consequence of this is increased concentration in sourcing, as mentioned in section 4. Competitive global suppliers are forming alliances, joint-ventures and other networks with the goal of becoming preferred suppliers for the multinationals that dominate world food trade. Hence, in addition to investments in productivity and quality, suppliers must undertake important investments in terms of organization if they want to penetrate international markets. South African companies are among the few on the continent, which have been engaged in such alliances. Sunkist, the largest citrus cooperative in the world, has forged an alliance with a company in South Africa to supply the Asian market; and Driscolls, the largest strawberry producer in the US, is in alliance with Kentish Group in the UK, in turn allied with Vital Berry in Chile, and the latter two are together investing in Argentina and South

Africa. Elsewhere, governments have been active in promoting the formation of such organizational capital by facilitating alliances with large retailers. In Malaysia, for instance, the government promotes linkages between domestic producers and domestic/foreign supermarket chains through the Federal Agricultural Marketing Authority (FAMA), helping suppliers to integrate local supply chains and open the doors for insertion in regional and global procurement chains. In Brazil, the Brazilian Export Promotion Agency (APEX) and the Industry and Trade Ministry have facilitated an agreement with Carrefour whereby the latter will promote Brazilian fruits in its European stores and later in its stores in Asia and the Americas (Reardon and Flores, 2006). This is especially relevant for small farmers. Innovative policies in this respect include supporting the formation of farmers' associations, as well as associations between farmers and agro industry, and supporting organizations that link input supply with information dissemination.

Promoting product differentiation (e.g. through promotion of country brands) is a complement to pursuing such a strategy. In South Africa, a large supplier of fresh citrus, among other fresh fruits, Outspan International decided to market all South African citrus under the "Outspan" label after being nominated as the single desk exporter of South African citrus in 1940 (a privilege it retained until recently). This allowed the company to market a variety of cultivars sourced in distinct ecological areas as a "national product" to northern hemisphere consumers with considerable success (Mather, 1999). Most African countries, on the other hand, despite supplying unique and/or high quality fresh foods, have so far been unable to market them accordingly, one case in point being Nile Perch from Lake Victoria which is marketed in developed country markets without any reference to its origin and characteristics ("firm boneless white flesh, high level of omega 3 fatty acids, mild flavour and flexibility for use in cooking"[60]).

Some African countries could benefit from their privileged geographical position with respect to other developing regions, particularly in the case of the most perishable fruits, vegetables and flowers, which must be air-freighted. In order to utilize this advantage, however, substantial investments in distribution services and infrastructure are required (e.g. cold storage; reliable transport connections between airports and producing areas; upgrading of airports to international standards) (UNIDO, 2004). This is especially relevant in that, increasingly, buyers require consistency in volumes delivered, quality and timing, as well as "just in shape delivery", i.e., the delivery of produce which needs no additional processing/labelling before being shelved (VEK-World Bank, 2004).

Investments in logistics infrastructure for air-freighted perishable exports have been key drivers of Kenya's export diversification success, helping to both attract and increase the returns on private sector investment (Bonaglia and Fukasaku, 2004). Hence, in addition to being an important exporter of fresh vegetables, Kenya is by far the largest exporter of cut flow-

ers in Africa (see table 6) and the 4th largest exporter in the world (after the Netherlands, Colombia and Ecuador).[61] In Ethiopia, where a flower industry is emerging, on the other hand, cargo bottlenecks created by inefficient airport infrastructure, insufficient cold facilities at the airport, and poor connection roads, are major barriers to expansion, despite generous incentives for private investors, which include: five-year tax exemptions; duty-free machinery imports, including irrigation systems and greenhouses; and easy access to bank loans.[62]

Djankov, Freund and Pham (2006) estimate that, in Africa, internal handling and transportation of goods for export takes over 1.5 months on average,[63] compared to 24 days in East Asia and the Pacific, 28 days in the Middle East and North Africa, 29 days in Latin America and the Caribbean, 33 days in South Asia and 13 days in developed countries. This is explained by poor port and road infrastructure (only one fourth of roads in Africa are paved, compared to 27 per cent in Latin America and 43 per cent in South Asia), and by excessive customs and tax procedures, clearances and cargo inspections. While each additional day a shipment is delayed reduces trade by at least 1 per cent, time-sensitive exports, such as fresh agricultural produce, are reduced by 6 times that amount.

Landlocked African countries face special challenges in dealing with inefficient customs procedures and high charges imposed for goods in transit. Whereas transport and insurance costs account for approximately 15 per cent of the value of exports originating in landlocked developing countries, this percentage reaches 32 per cent in landlocked African LDCs – against an average 8 per cent and 6 per cent in developing and OECD countries, respectively. In coastal African countries these costs reach 15 per cent. Furthermore, poor regional connections characterize the continent and contribute to explaining the relatively low share of intra-African trade (AfDB/OECD, 2006).

In light of this and the shift in the composition of Official Development Assistance (ODA) for LDCs away from the infrastructure and productive sectors towards social expenditures since the early nineties (UNCTAD, 2006a), increased FDI in basic infrastructure from China is a welcome development. While a large part of this investment will mostly benefit the mineral sector – including for the rehabilitation and construction of roads and railways connecting mineral-rich areas to ports in Angola and Mozambique – (AfDB/OECD, 2006), there is evidence of China's starting to invest in the agricultural, telecommunications and power infrastructure sectors. For instance, the China Grains & Oils Group, one of China's larger agricultural companies, has invested in a soybean processing plant in Mozambique (Bosten, 2005). China has also been providing extension services and technology transfer to small farmers and fishermen in a number of African countries in the context of the South-South Cooperation initiative of FAO's Special Programme for Food Security.

In addition to poor infrastructure and organizational capital, "under-

funded knowledge creation"[64] (Laiglesia, 2006, p.52) is a major constraint to upgrading Africa's agricultural sector in general and increasing exports of non traditional agricultural products in particular. With few exceptions, the agricultural sectors' total factor productivity growth over the 1960-2000 period in low income African countries was below the rates achieved in Asia and Latin America (Bravo-Ortega and Lederman, 2005a).Yield improvements in fruits and vegetables (which worldwide have been lower than in cereals) have been especially low in Africa. For instance, between 1961 and 2004, yields in vegetables in Africa grew at an average annual rate of 0.6 per cent (versus 0.7 per cent for cereals) compared to an average 1.4 per cent for the world (Weinberger and Lumpkin, 2005).

As mentioned earlier, public R&D (e.g. identification of products with export potential, selection of suitable varieties, and adaptation of those varieties to local conditions) has a fundamental role in attracting the private sector to invest in new activities characterized by high uncertainty and low appropriability.[65] Crop breeding and research on disease control have many public good characteristics which make it fundamentally dependent on public sector intervention (Masters, 2005).Thus, it is of concern that, in Africa, the intensity of public expenditure in agricultural R&D (irrespective of whether intensity is measured in relation to agricultural GDP or economically active agricultural population) exhibits a downward trend over the 1980-2000 period, in contrast to the other regions in the developing world. In fact, approximately half of the African countries for which information is available spent less on agricultural R&D in 2000 than in 1991 in absolute terms as well (Pardey et al., 2006). While developed countries spent on average 3.5 US PPP dollars per hectare of agricultural land in 1991, and developing countries spent on average almost 2.5 US PPP dollars, Africa spent less than 1 dollar (Masters, 2005).

The trends described in the previous paragraph can be attributed to a shift of bilateral and multilateral donor support – on which African domestic R&D efforts depend for funding (exceptions are Botswana, Malawi, Mauritius and Sudan) – away from the agricultural sector in general and agricultural research in particular. For instance, USAID funding for agricultural research projects in Africa fell to 23 per cent of the levels in the mid-1980s; World Bank lending for agriculture also exhibits a downward trend in real terms since the 1980s (Pardey et al., 2006).

This is compounded by the fact that horticultural research has received relatively little attention from the international agricultural research centres until very recently. In 2002, the Consultative Group on International Agricultural Research (CGIAR) system's expenditures in horticultural research amounted to only 13 per cent of the expenditures in cereal-related research (Weinberger and Lumpkin, 2005).

Finally, especially in the cases where production is dominated by smallholders, conversion to non traditional crops – and, within these, to those cul-

tivars and varieties for which demand is high and which can be produced at a lower cost – can be facilitated by public sector intervention (see also section 4 for examples in Chile and Malaysia). The success of the Ghanaian pineapple industry has been based on targeting the discount segment of the Northern European market and competing on price (although some companies have started to supply higher value-added products as well, such as sliced pineapple, fruit salads, and pineapple juice). One important advantage until recently was its air-freight cost advantage compared to other countries in the region. Since 1996, however, it has sustained increasing competition from a higher yielding cultivar grown in Costa Rica (the MD2) which is also sweeter and more flavourful than the main cultivar exported by Ghana (Smooth Cayenne). Because MD2 is not a proprietary cultivar and since consumer loyalty appears to be related to its intrinsic characteristics rather than to the Del Monte brand, Ghana has put in place a concerted strategy to convert production to the higher yielding cultivar. With donor support, the government is playing an important role in this process through its Agricultural Services Support and Investment Program (AgSSIP). In addition to supporting crop conversion among the smallholders which dominate pineapple production in the country, other actions in the context of this programme include developing local capacities in tissue culture multiplication techniques and investments in cold-chain facilities and other export infrastructure (Danielou and Ravry, 2005).

6. Conclusions

It is a broadly held view that natural resource-based sectors exhibit low productivity growth, are less dynamic in international trade, have low innovation and knowledge content and encompass fewer linkages with the rest of the economy, thus having lower multiplier effects. We have shown that this does not always hold, especially in the agricultural sector, and therefore that specialization in manufacturing is not a necessary condition for sustained economic growth.

With the exception of cotton, African producers of traditional agricultural commodities have steadily been losing market share to Asian and Latin American competitors over the last two decades. This holds even for cocoa, where the Ivory Coast remains a dominant supplier. Stagnant yields and inability to improve price/quality ratios stand in stark contrast with trends in competing countries.

While Africa is mainly an exporter of basic primary commodities, it has been increasing its market share, sometimes very significantly, for some dynamic, high unit value agricultural activities for which low labour costs are a crucial competitiveness factor. Nevertheless, exports of products in the latter group are still very small and concentrated in a handful of countries. Moreover, processes of value-addition and differentiation in traditional export sectors have been limited.

Common constraints in most countries are poorly funded R&D, poor capability to comply with SPS and other standards in developed country markets, poor "organizational capital", and poor logistics infrastructure – to be able to deliver products at the price and in the volumes, quality and timing required by international buyers. In some instances, African suppliers which had achieved important market shares at a given point in time are now losing this advantage in favour of suppliers with access to better infrastructure and/or which have been able to innovate and increase productivity in order to overcome existing infrastructure or geographical disadvantages. The development of the papaya cultivar in Brazil, which can now be sea-freighted and which has undermined Ghana's low-cost advantage in air-freighted papayas to Europe, illustrates the latter point (Danielou and Ravry, 2005).

Also, increasingly, the ability to organize in order to promote exports under a national country brand and to penetrate global supply chains has been a discriminating factor in favour of Asian and Latin American producers. High supplier concentration further suggests that scale matters. Only South Africa (fruits) and Kenya (vegetables and cut flowers) consistently emerge as one of the two largest suppliers in the US and the EU. Some countries are emerging as suppliers of meats (Botswana, Namibia), vegetables, fruits and flowers (Zimbabwe and Swaziland), fish fillets (Uganda and Tanzania) (fish fillets) and edible nuts (Malawi and Mozambique), but it remains to be seen whether the very high investments undertaken to penetrate international markets are sufficient to withstand competition from much larger suppliers elsewhere. The case of Botswana versus Namibia (see section 5) suggests that additional efforts to differentiate domestic exports may be required to exploit niche markets where competition is not (solely) based on cost advantages.

The proactive actions undertaken in Chile and Malaysia to maintain advantage in increasingly competitive international markets, by constantly innovating to increase product differentiation and finding new products that can be marketed cost effectively, suggest that concurrent public policy interventions and coordinated actions with and within the private sector are crucial in that process. Areas where public support, by direct (e.g. tax incentives and subsidized credit) or indirect (e.g. allocation of public funds through competitive bidding), means have been key include: allocation of the "commons"; promoting targeted R&D and technology transfer towards new activities; upgrading of transportation infrastructure; development of institutions for quality control and traceability; overseas marketing; and supporting the formation of producer associations and their articulation with global value chains. Once new activities achieve a certain degree of maturity, private sector associations appear as important actors in maintaining leadership in international markets and undertake activities that either complement or reinforce public intervention, including through promotion overseas, standard-setting and provision of technical assistance along value chains.

The case for concerted government interventions at many different levels is in line with recent work by Hausmann and Rodrik (2006, p.24) who argue that notions such as property rights, institutions and infrastructure involve "very many different activities that are highly [sector] specific and need to be conceived, planned and organized by a myriad of different organizations or networks of organizations".

Although there is a dearth of quantitative data regarding the overall cost of these interventions, the information available suggests they are not trivial. Focusing on fast growing but less demanding developing country markets with complementary specialization patterns could prove useful for some countries at low levels of development. The growing interest of China in Africa as an investment destination and a source for raw materials could be utilized to the benefit of Africa's agricultural sector, as evidence of increased technical assistance, investments and emerging exports seems to suggest. Support from international donors was an important aspect of Chile's fruit and salmon sectors' early development and in success stories in low income countries in Africa as well. South-South cooperation could play a similar role.

Political and macroeconomic stability have to be in place before issues such as capability to comply with developed country quality standards become relevant. Ivory Coast was on most accounts a major success story until political strife overtook the country in the end of the nineties. Some countries with great agricultural potential, such as Angola and Mozambique, have only recently emerged from decade-long conflicts, but are already attracting a lot of attention from the private sector, including foreign investment.

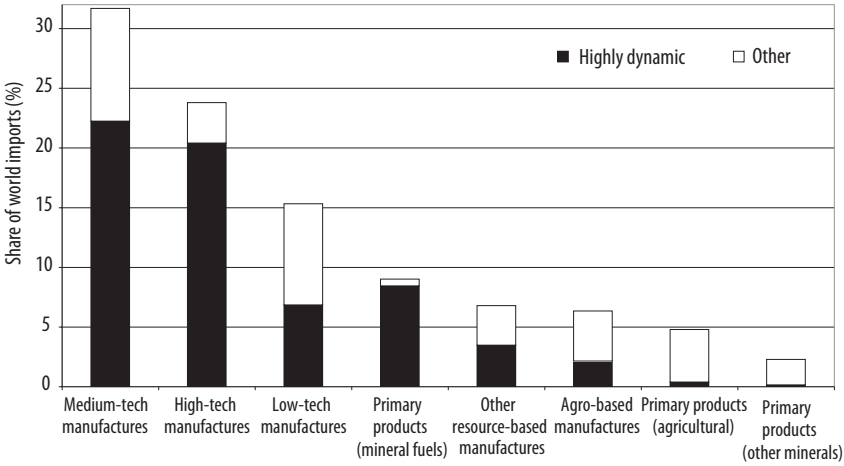
One caveat with respect to the distributional consequences of developing non traditional agriculture is in order. In Latin America, for instance, this process has been highly concentrated in medium to large farms (David, Dirven and Vogelgesang, 2000). There is also evidence that smallholder participation in agricultural exports has declined to a significant extent since the early 1990s in some African countries (e.g. Minot and Ngigi, 2003). The exceptions tend to go hand in hand with targeted government support. Access to subsidized credit (in the case of products requiring significant investments) and technical assistance (in the case of products with relatively complex production technologies) have proven to be critical in enabling small farmers to adopt new, higher return crops in Ecuador, Guatemala and Brazil (Damiani, 2000). In Africa, there is evidence that supermarkets will source from small horticultural producers provided there is institutional support to "upgrade" them to meet quality, safety, consistency and cost standards (Weatherspoon and Reardon, 2003, p.352). Other illustrations of the government's role in enhancing smallholder participation in new dynamic sectors are provided in section 4, and this was especially important in Malaysia. Increased smallholder participation is, however, not the only means whereby rural incomes can be enhanced. First, large operations producing fruits, flowers and other labour-intensive crops generate employment (this of course does

not hold in the case of grain or soybean production, both of which are highly capital-intensive in most countries). Secondly, agricultural activities create demand for labour-intensive services such as packing, which can be better remunerated than on-farm work. In Chile, overall direct smallholder participation in the fresh fruit export sector is relatively small. Still, due to the high labour intensity of the agro-processing sector (e.g. post harvest activities such as selection and packing), and increased employment and wages in larger farms, both of which employ unskilled labour, the agricultural sector has contributed to reducing poverty (López and Anriquez, 2003a). The magnitude of the positive contribution of agricultural growth on the incomes of the poorest will thus depend on context.

From a sustainable development perspective, it is also important to consider to what extent agricultural growth entails negative environmental consequences. As mentioned before, in East Africa, fish stocks are being depleted at high rates, threatening the survival of the nascent fish processing industry. In the south of Chile, salmon farms have polluted and generated ecological imbalances in inland lakes and streams (Altieri and Rojas, 1999). The expansion of the agricultural frontier through deforestation in countries like Brazil and Malaysia is an important contributor to CO_2 emissions and loss of biodiversity (Wakker, 2005). However, as Bravo-Ortega and Lederman (2005b) point out, most empirical research has been focused on the negative impacts of agricultural growth, rather than on its benefits compared to other economic sectors, which are shown to be overall relatively benign. At the same time, there exists relatively little research comparing the impact of traditional agriculture and non traditional export products. In Chile, for instance, the use of agro-chemicals has increased substantially in the nineties, but it would have risen even faster if expansion in the agricultural sector had been led by traditional import-competing crops, which are more reliant on pesticide use (López and Anriquez, 2003b).

In conclusion, current domestic capabilities and endowments in the great majority of African countries suggest that it is more realistic to find opportunities for upgrading within the primary and natural resource-based sectors. The potential for generating spillovers to other sectors and sustaining growth, as well as for poverty reduction, is probably greater in agriculture than in other sectors. Thus, contrary to the commonly held view that Africa cannot industrialize and thus can not develop, we take a more optimistic stance, agreeing that much of Africa faces major challenges in the production of sophisticated manufactures in the foreseeable future, but arguing that it can probably compete in the production of some dynamic, high unit value primary agricultural products and agricultural manufactures. The current boom in commodity prices boosted by increasing demand from Asia might just provide the necessary leverage to undertake the investments this requires.

Figure 1. Distribution of world trade, by technological categories and dynamism, 2004



Source: the authors based on UN COMTRADE data and Lall's (2000) technological categories.

Table 1.
Average annual growth in multi-factor productivity across sectors (%)

Country (region) and period	Source	Mining	Coal	Petroleum	Copper	Agriculture	Manufacturing
United States 1970-1980	Parry (1997)	--	-3.5	-7.0	-2.5	--	0.8
United States 1980-1992	Parry (1997)	-	2.6	1.3	3.9	--	1.4
14 OECD countries 1970-1987	Bernard and Jones (1996)	-0.1	--	--	--	3.0	2.0
33 developing countries 1967-1992	Martin and Mitra (2001)	--	--	--	--	2.6	0.9
18 developed countries 1967-1992	Martin and Mitra (2001)	--	--	--	--	3.5	2.8

Table 2.
Examples of dynamic primary agricultural products and agro-based manufactures (1990-2004)

	Dynamic (growing above the median)	Highly dynamic (growing above the median and increasing market share in total world trade)
Primary agricultural goods	**Pig meat** fresh, chilled or frozen; **Poultry**, fresh, chilled or frozen**; Milk and cream fresh**, not concentrated or sweetened; **Eggs**; **Fish fillets**, frozen; **Fish fillets**, fresh or chilled; **Rye**, unmilled; **Other fresh or chilled vegetables** (a); **Nuts**, edible, fresh or dried; **Fruit**, fresh or dried, nes (b); **Coffee** extracts, essences or concentrates; **Cocoa powder,** unsweetened; **Spices**, except pepper and pimento; **Margarine**, imitation lard and other prepared edible fats nes; Most **oilseeds, oilcake and oilseed flour**; **Cotton,** carded or combed; **Palm nuts and kernels**	**Milk and cream fresh**, not concentrated or sweetened; **Fish fillets,** fresh or chilled; **Cocoa powder**, unsweetened; **Margarine**, imitation lard and other prepared edible fats nes; **Soya beans**; **Cotton seeds**; **Cotton**, carded or combed
Agro-based manufactures	**Edible products and preparations** (e.g. soups and sauces); **Wine**; Materials and products of **rubber**; **Bakery products**; **Chocolate** and other preparations containing cocoa; **Non-alcoholic beverages** nes; **Vegetables,** prepared or preserved, nes; **Beer** made from malt; Other prepared or preserved **meat**; **Malt** extract; **Sugar confectionery** and preparations, non-chocolate; all **vegetable oils**; **Tobacco,** manufactured; **Sausages** and the like, of meat; **Jams**, jellies and marmalades; Natural **honey**; processed **animal and vegetable oils**	**Edible products and preparations** (e.g. soups and sauces); Materials and products of **rubber**; **Bakery products**; **Non-alcoholic beverages** nes; **Beer** made from malt; **Malt** extract; **Sugar confectionery** and preparations, non-chocolate; **Palm and palm kernel oil**; **Soya bean oil**; **Olive oil**; **Tobacco,** manufactured; Natural **honey**; processed **animal and vegetable oils.**

Obs.: (a) This group includes all fresh or chilled vegetables, except tomatoes, leguminous and alliaceous vegetables. (b) This group includes all tropical fruits, plus berries and avocados. Citrus, bananas, apples, grapes and figs are not in this group, although their growth performance was respectable, ranging between 3.5 per cent and 4.5 per cent annually.

Table 3.
Main markets for Africa's traditional agricultural exports

	Share of world imports (a)	Share of partner in Africa's exports (b)		Share of Africa in partner's market (a)	
	2004	1990	2004	1990	2004
EU15	31.6	65.0	55.7	32.4	36.0
China	8.8	2.5	7.9	13.0	18.2
USA	14.1	7.7	7.2	8.6	10.5
Sum	**54.4**	**75.2**	**70.8**	--	--

Source: authors, based on UN-COMTRADE data. SITC rev.2 codes: 0573,0611,0612,0615,07111,07112,0721,0722,0723,2631,2632,2633,2634,0741.
Obs.: (a) Intra-EU trade is excluded. (b) Exports mirrored by partner's imports.

Table 4.
Main markets for Africa's exports of high value agricultural products, plus China

	Share of world imports (a)	Share of partner in Africa's exports (b)		Share of Africa in partner's market (a)	
	2004	1990	2004	1990	2004
EU15	25.8	69.6	72.0	9.0	11.7
USA	18.9	2.5	4.5	0.5	1.0
Japan	16.0	8.4	5.0	1.6	1.3
China	4.2	0.1	0.5	0.2	0.5
India	1.8	1.8	4.3	10.6	10.0
Sum	**66.6**	**82.4**	**86.2**	--	--

Source: authors, based on UN-COMTRADE data.
Obs.: (a) Intra-EU trade is excluded. (b) Exports mirrored by partner's imports.

Table 5. Africa's insertion in selected world markets for high value agricultural goods (sorted by value of total imports in selected market)

SITC Rev 2 Code & description by Country reporter		Total imports		Sub Saharan Africa		
		Value 2004	Annual growth rate (%) 1990-2004	Annual growth rate (%) 1990-2004	Market share (%) 2004	Growth rate (%) 1990-2004
USA		37,908,240,014	5.6	10.3	1.0	83
0344	Fish fillets, frozen	1,587,812,433	2.7	30.5	1.7	2,731
05857	Juice of any other fruit or vegetable	592,707,245	6.1	42.3	1.6	5,970
05779	Edible nuts, fresh or dry, nes	308,057,082	8.0	21.9	14.7	445
07521	Vanilla	205,113,652	10.7	11.6	76.1	12
05712	Mandarins and similar citrus, fresh or dried	140,661,019	17.4	…	14.0	…
05481	Roots and tubers, with high starch or insulin, fresh or dried	118,782,631	8.9	21.8	3.0	379
29272	Cut foliage, fresh, dried, bleached, etc	114,007,879	5.8	19.5	1.9	448
05891	Nuts, roasted (including peanut)	112,905,995	11.5	7.0	1.6	-44
05792	Pears and quinces, fresh	80,443,361	6.6	…	2.3	…
05711	Oranges, fresh or dried	69,916,046	19.4	79.1	44.1	29,204
07526	Ginger (except in sugar or in syrup)	37,004,934	9.8	7.4	2.4	-27
05853	Juice of any other citrus fruit	30,930,477	-1.8	21.1	4.4	1,788
05858	Mixtures of fruit or vegetable juices	24,067,694	4.8	…	6.9	…
05752	Grapes dried (raisins)	15,096,213	3.4	…	15.1	…
05488	Vegetable products, primarily for human food, nes	8,588,968	5.6	…	1.1	…
05643	Flour, meal and flakes of potato	7,214,652	16.9	…	1.6	…
05649	Flours of leguminous, fruits, roots and tubers	6,050,658	4.3	8.4	7.3	70
07523	Cloves	3,007,102	-2.3	1.4	48.7	67
EU - 15 (excluding intra-EU trade)		52,037,862,898	4.2	6.2	11.7	30
0360	Crustaceans and molluscs, fresh, chilled, frozen, salted, etc	4,581,225,503	5.3	6.7	14.6	21
0573	Banana, plantain, fresh or dried	3,507,793,803	3.7	7.6	13.8	67
0344	Fish fillets, frozen	2,506,160,445	5.5	12.2	10.8	136
0341	Fish, fresh or chilled, excluding fillet	2,274,055,069	3.9	11.6	9.6	170
0371	Fish, prepared or preserved, nes	1,983,860,427	4.1	8.7	32.3	84
0342	Fish, frozen, excluding fillets	1,466,106,754	0.7	2.3	21.3	25
01112	Bovine meat fresh, chilled or frozen, boneless	1,386,354,431	4.0	3.1	7.0	-12

continued

SITC Rev 2 Code & description by Country reporter		Total imports		Sub Saharan Africa		
		Value 2004	Annual growth rate (%) 1990-2004	Annual growth rate (%) 1990-2004	Market share (%) 2004	Growth rate (%) 1990-2004
05459	Vegetables, fresh or chilled, nes	1,302,099,713	9.6	9.4	21.8	-3
0574	Apples, fresh	1,171,877,460	3.2	0.7	18.1	-29
05798	Other fresh fruit	1,028,340,008	7.4	8.3	11.1	13
05751	Grapes fresh	990,601,424	9.0	10.8	41.2	27
05899	Fruit and nuts, prepared, preserved, nes	827,429,120	2.0	-0.3	20.1	-27
05779	Edible nuts, fresh or dry, nes	806,398,950	5.6	24.9	2.6	943
05659	Vegetables prepared or preserved other than vinegar, nes	798,433,437	5.7	8.5	4.9	46
29271	Cut flowers and flower buds, fresh, dried, bleached, etc	793,456,022	5.9	13.2	53.1	156
0542	Beans, peas, other leguminous vegetables, dried, shelled	685,181,821	0.9	-1.5	2.6	-29
05795	Pineapples, fresh or dried	672,580,290	12.2	6.8	37.8	-50
0343	Fish fillets, fresh or chilled	644,513,293	21.3	45.8	35.5	1,207
05711	Oranges, fresh or dried	565,395,620	-0.2	5.2	43.4	110
05797	Avocados, mangoes, guavas, mangos-teens, fresh or dried	460,200,688	5.9	3.5	27.5	-27
05793	Stone fruit, nes, fresh	431,027,056	9.8	12.0	24.5	33
05461	Vegetables, preserved by freezing	422,625,677	3.1	-3.9	1.6	-63
05792	Pears and quinces, fresh	382,926,998	2.5	3.8	34.4	19
05752	Grapes dried (raisins)	374,527,873	1.5	1.3	6.3	-2
29269	Other live plants	328,016,157	6.2	12.2	20.2	114
29272	Cut foliage, fresh, dried, bleached, etc	326,874,006	6.1	4.2	6.0	-22
05481	Roots and tubers, with high starch or insulin, fresh or dried	304,092,230	-6.9	2.9	5.5	301
05712	Mandarins and similar citrus, fresh or dried	301,737,949	3.7	15.8	17.0	370
05722	Grapefruits, fresh or dried	289,221,672	-0.5	0.5	20.2	16
0561	Vegetables (excluding leguminous), dried, evaporated, etc	288,471,958	3.3	-1.1	1.5	-46
05799	Other dried fruit	287,820,256	4.0	-2.7	1.1	-61
05451	Alliaceous vegetables, fresh or chilled	275,795,982	3.9	10.6	3.8	141
05773	Cashew nuts, fresh or dried	269,049,071	11.1	-0.5	1.1	-79
01189	Meat and edible meat offal, fresh, chilled, or frozen, nes	268,207,154	-0.1	16.0	9.2	709

continued

SITC Rev 2 Code & description by Country reporter		Total imports		Sub Saharan Africa		
		Value 2004	Annual growth rate (%) 1990-2004	Annual growth rate (%) 1990-2004	Market share (%) 2004	Growth rate (%) 1990-2004
05721	Lemons and limes, fresh or dried	258,335,233	9.6	10.3	11.3	9
05651	Vegetables and fruit, in vinegar or acetic acid	254,339,518	6.9	21.0	2.7	471
0544	Tomatoes, fresh or chilled	251,627,147	2.9	14.3	2.7	336
0751	Pepper of piper; pimento of capsicum or pimenta	249,189,803	2.9	4.4	6.2	22
05794	Berries, fresh	207,478,042	7.9	1.8	1.0	-56
05854	Pineapple juice	171,439,946	6.2	1.7	14.8	-45
05796	Dates, fresh or dried	137,034,884	3.4	39.1	1.3	6226
4234	Groundnut (peanut) oil	122,612,060	-3.4	-8.8	31.2	-56
03504	Fish smoked	118,433,300	9.6	13.2	2.2	59
07528	Thyme, saffron, bay leaves; other spices	98,698,367	10.0	9.1	1.9	-10
07521	Vanilla	94,895,107	7.5	4.1	54.8	-36
4249	Fixed vegetable oils, nes	91,910,602	-0.4	7.7	12.4	198
05771	Coconuts, fresh or dried (excluding copra)	79,798,420	0.7	-2.7	7.4	-38
05852	Grapefruit juice	69,439,160	-1.1	6.8	9.1	193
29261	Bulbs, tubers, corms and others; dormant, in growth or in flower	53,048,259	8.8	2.1	8.3	-59
07526	Ginger (except in sugar or in syrup)	47,314,643	9.1	9.7	11.1	8
0583	Jams, jellies, marmalades, etc, as cooked preparations	33,516,933	5.9	3.2	6.9	-31
05649	Flours of leguminous, fruits, roots and tubers	30,076,785	1.1	13.3	2.9	396
05858	Mixtures of fruit or vegetable juices	28,908,493	3.8	8.6	4.5	88
05853	Juice of any other citrus fruit	27,897,139	0.4	-8.6	3.5	-73
07522	Cinnamon and cinnamon-tree flowers	13,306,295	0.3	-7.8	3.6	-69
05864	Peel of melons or citrus fruit, fresh, frozen, dried, etc	7,423,435	4.5	25.5	18.4	1,195
0121	Bacon, ham, other dried, salted or smoked meat of domestic swine	6,731,089	0.4	…	5.2	…
05729	Citrus fruit, nes, fresh or dried	6,147,705	7.7	27.0	21.8	902
07523	Cloves	6,036,878	1.1	-1.5	54.9	-30
05645	Tapioca, sago and substitutes obtained from starches	2,738,705	2.2	-6.8	1.8	-72

Source: the authors, based on UN-COMTRADE data.
Obs.: (a) products for which Africa has a market share below 1 per cent are not included in the table but are included in the totals. An empty cell means that no exports of that product category were registered in 1990.

Table 6.
Africa's largest exporters' and main competitors' insertion in selected world markets for high value agricultural goods (market shares, %, 2004)

Code SITC Rev.2	Description	Largest supplier		2nd largest supplier		Largest suppliers in Africa *(in addition to those found in the first two columns)*			
EU-15									
01112	Bovine meat fresh, chilled or frozen, boneless	Brazil	51.1	Argentina	27.8	Namibia	3.7	Botswana	3.1
01189	Meat and edible meat offal, fresh, chilled, or frozen, nes	New Zealand	41.2	Poland	10.1	South Africa	7.9	Zimbabwe	1.1
0121	Bacon, ham, other dried, salted or smoked meat of domestic swine	Areas, nes	31.7	Poland	13.3	Ivory Coast	4.7	Central African Rep.	0.5
0341	Fish, fresh or chilled, excluding fillet	Norway	51.7	Faeroe Isds	8.0	South Africa	3.6	Senegal	2.3
0342	Fish, frozen, excluding fillets	Russian Federation	13.3	USA	11.6	Namibia	7.5	South Africa	5.0
0343	Fish fillets, fresh or chilled	Iceland	24.4	Norway	18.8	United Rep. of Tanzania	13.7	Uganda	13.0
0344	Fish fillets, frozen	China	16.4	Norway	13.3	Namibia	6.2	South Africa	2.4
03504	Fish smoked	Poland	68.7	Norway	10.8	Ivory Coast	1.7	Ghana	0.2
0360	Crustaceans and molluscs, fresh, chilled, frozen, salted, etc	India	8.3	Argentina	8.2	Madagascar	3.4	Senegal	2.3
0371	Fish, prepared or preserved, nes	Morocco	11.1	Ecuador	10.2	Seychelles	9.6	Ivory Coast	7.8
0542	Beans, peas, other leguminous vegetables, dried, shelled	Canada	42.2	China	10.6	Ethiopia	1.1	United Rep. of Tanzania	0.8
0544	Tomatoes, fresh or chilled	Morocco	68.5	Israel	12.6	Senegal	2.6	South Africa	0.1
05451	Alliaceous vegetables, fresh or chilled	Argentina	21.4	New Zealand	18.2	South Africa	2.8	Kenya	0.7
05459	Vegetables, fresh or chilled, nes	Morocco	16.5	Kenya	13.9	Zambia	1.3	Zimbabwe	1.1

continued

Code SITC Rev.2	Description	Largest supplier		2nd largest supplier		Largest suppliers in Africa (in addition to those found in the first two columns)			
05461	Vegetables, preserved by freezing	Poland	26.8	China	19.1	Kenya	0.7	South Africa	0.5
05481	Roots and tubers, with high starch or insulin, fresh or dried	Thailand	76.2	Israel	4.4	Ghana	3.3	South Africa	0.8
0561	Vegetables (excluding leguminous), dried, evaporated, etc	China	31.3	USA	10.3	Zimbabwe	0.9	Senegal	0.1
05645	Tapioca, sago and substitutes obtained from starches	China	39.5	Thailand	34.6	Madagascar	0.6	Nigeria	0.5
05649	Flours of leguminous, fruits, roots and tubers	Turkey	41.9	USA	21.4	Nigeria	1.2	Ghana	0.6
05651	Vegetables and fruit, in vinegar or acetic acid	Turkey	47.3	Hungary	10.9	South Africa	2.1	Madagascar	0.5
05659	Vegetables prepared or preserved other than vinegar, nes	China	39.5	Peru	13.9	Kenya	3.0	Cameroon	0.6
05711	Oranges, fresh or dried	South Africa	39.2	Morocco	17.4	Zimbabwe	2.5	Swaziland	1.7
05712	Mandarins and similar citrus, fresh or dried	Morocco	31.3	South Africa	16.5	Zimbabwe	0.3	Swaziland	0.2
05721	Lemons and limes, fresh or dried	Argentina	52.6	Brazil	16.0	South Africa	11.2	Zimbabwe	0.1
05722	Grapefruits, fresh or dried	USA	28.5	South Africa	18.0	Swaziland	1.4	Zimbabwe	0.4
05729	Citrus fruit, nes, fresh or dried	Israel	48.7	South Africa	20.4	Zimbabwe	1.4	…	…
0573	Banana, plantain, fresh or dried	Ecuador	22.9	Costa Rica	22.5	Ivory Coast	6.9	Cameroon	6.7
0574	Apples, fresh	New Zealand	28.8	South Africa	18.1	Ivory Coast	0.0	Central African Rep.	0.0
05751	Grapes fresh	South Africa	39.8	Chile	24.2	Namibia	1.4	Ivory Coast	0.0
05752	Grapes dried (raisins)	Turkey	59.1	USA	21.3	South Africa	6.3	…	…

continued

Code SITC Rev.2	Description	Largest supplier		2nd largest supplier		Largest suppliers in Africa *(in addition to those found in the first two columns)*			
05771	Coconuts, fresh or dried (excluding copra)	Philippines	34.9	Indonesia	20.1	Ivory Coast	7.3	South Africa	0.1
05773	Cashew nuts, fresh or dried	India	64.1	Viet Nam	27.7	United Rep. of Tanzania	0.3	Mozambique	0.2
05779	Edible nuts, fresh or dry, nes	USA	40.1	Iran	28.4	South Africa	2.0	Malawi	0.3
05792	Pears and quinces, fresh	Argentina	40.7	South Africa	34.4	Fmr Ethiopia	0.0	Central African Rep.	0.0
05793	Stone fruit, nes, fresh	Turkey	30.3	South Africa	24.3	Namibia	0.1	Zimbabwe	0.0
05795	Pineapples, fresh or dried	Costa Rica	49.2	Ivory Coast	23.8	Ghana	11.3	South Africa	1.2
05796	Dates, fresh or dried	Tunisia	50.9	Israel	22.0	South Africa	1.2	Namibia	0.1
05797	Avocados, mangoes, guavas, mangos-teens, fresh or dried	Brazil	19.1	Israel	15.7	South Africa	14.7	Kenya	5.4
05798	Other fresh fruit	New Zealand	32.7	Brazil	15.7	Madagascar	7.7	South Africa	1.9
05799	Other dried fruit	Turkey	36.8	USA	26.5	South Africa	1.0	Madagascar	0.0
0583	Jams, jellies, marmalades, etc, as cooked preparations	Turkey	38.7	Bulgaria	9.1	South Africa	5.2	Swaziland	0.7
05852	Grapefruit juice	USA	44.0	Israel	24.6	South Africa	8.3	Swaziland	0.8
05853	Juice of any other citrus fruit	Argentina	47.2	Brazil	19.0	South Africa	2.7	Ivory Coast	0.3
05854	Pineapple juice	Thailand	34.3	Costa Rica	11.8	Kenya	7.8	South Africa	4.5
05858	Mixtures of fruit or vegetable juices	USA	40.0	Israel	12.6	South Africa	4.6	Ghana	0.0
05864	Peel of melons or citrus fruit, fresh, frozen, dried etc	Haiti	19.0	Brazil	14.2	Ghana	11.5	Senegal	5.0
05899	Fruit and nuts, prepared, preserved, nes	Thailand	19.5	South Africa	11.5	Kenya	6.2	Swaziland	2.0
0751	Pepper of piper"; pimento of "capsicum or pimenta""	Brazil	17.8	Viet Nam	16.7	Zimbabwe	2.7	South Africa	1.9
07521	Vanilla	Madagascar	47.5	Indonesia	18.3	Comoros	5.9	Uganda	1.3

continued

Code SITC Rev.2	Description	Largest supplier		2nd largest supplier		Largest suppliers in Africa (in addition to those found in the first two columns)			
07522	Cinnamon and cinnamon-tree flowers	Indonesia	40.8	Sri Lanka	27.4	Madagascar	2.9	Seychelles	0.6
07523	Cloves	Madagascar	30.7	Comoros	22.7	Tanzania	1.5	Mali	0.0
07526	Ginger (except in sugar or in syrup)	China	46.6	Thailand	15.7	Nigeria	8.2	South Africa	1.2
07528	Thyme, saffron, bay leaves; other spices	Iran	27.0	India	17.1	South Africa	1.3	Mauritius	0.3
29271	Cut flowers and flower buds, fresh, dried, bleached, etc	Kenya	36.1	Israel	14.2	Zimbabwe	6.2	Uganda	3.3
29272	Cut foliage, fresh, dried, bleached, etc	USA	26.8	Costa Rica	18.1	South Africa	5.4	Kenya	0.3
29261	Bulbs, tubers, corms and others; dormant, in growth or in flower	USA	14.4	Chile	13.6	South Africa	7.7	Kenya	0.3
29269	Other live plants	Costa Rica	13.0	Israel	12.0	Kenya	11.1	Uganda	3.3
4234	Groundnut (peanut) oil	India	44.5	Senegal	21.2	Gambia	7.0	Sudan	2.8
4249	Fixed vegetable oils, nes	USA	34.2	China	9.5	Ghana	4.9	South Africa	4.3
USA									
0343	Fish fillets, fresh or chilled	Chile	52.1	Canada	16.7	Uganda	0.6	Kenya	0.1
05481	Roots and tubers, with high starch or insulin, fresh or dried	Costa Rica	49.0	Dominican Rep.	14.9	Ghana	2.9	Nigeria	0.1
05488	Vegetable products, primarily for human food, nes	China	32.4	Other Asia, nes	20.9	South Africa	1.1	…	…
05643	Flour, meal and flakes of potato	Canada	56.6	Spain	19.6	Ethiopia	0.8	Djibouti	0.8
05649	Flours of leguminous, fruits, roots and tubers	Canada	30.2	Thailand	13.5	Ghana	3.6	Nigeria	2.1
05711	Oranges, fresh or dried	Australia	44.6	South Africa	44.1	…	…	…	…

continued

Code SITC Rev.2	Description	Largest supplier		2nd largest supplier		Largest suppliers in Africa (in addition to those found in the first two columns)			
05712	Mandarins and similar citrus, fresh or dried	Spain	76.4	South Africa	14.0	…	…	…	…
05752	Grapes dried (raisins)	Chile	50.7	Mexico	22.6	South Africa	15.1	…	…
05779	Edible nuts, fresh or dry, nes	Mexico	45.7	China	17.4	South Africa	6.3	Kenya	4.0
05792	Pears and quinces, fresh	Argentina	37.4	Chile	26.3	South Africa	2.3	…	…
05853	Juice of any other citrus fruit	Mexico	48.4	Argentina	30.5	South Africa	4.4	Swaziland	0.0
05857	Juice of any other fruit or vegetable	China	32.5	Argentina	19.0	South Africa	1.6	Ghana	0.0
05858	Mixtures of fruit or vegetable juices	Canada	30.6	Mexico	29.7	South Africa	6.9	Kenya	0.0
05891	Nuts, roasted (including peanut)	Canada	25.7	China	12.7	Kenya	1.2	Mozambique	0.2
07521	Vanilla	Madagascar	65.6	Indonesia	13.5	Comoros	7.8	Uganda	2.7
07523	Cloves	Madagascar	32.1	Brazil	19.3	Comoros	14.0	Tanzania	2.6
07526	Ginger (except in sugar or in syrup)	China	71.6	Brazil	11.2	Nigeria	2.4	South Africa	0.1
29272	Cut foliage, fresh, dried, bleached, etc	Canada	43.3	Italy	8.1	South Africa	1.2	Madagascar	0.5

Source: the authors, based on UN-COMTRADE data.
Obs.: only products for which Africa as a whole had a market share of at least 1 per cent are included in the table. Intra-EU trade is excluded.

Notes

1 The slowdown during the 1970s could partly be explained by exceptionally high prices inducing small, inefficient mines to enter these sectors, the introduction of a number of environmental, health and safety regulations, and the occurrence of important disruptions due to strikes. These factors would have had a negative, but transitory, effect on multi-factor productivity growth. That is, "in retrospect the 1970s look like an exceptional period, rather than marking a change in long-run productivity trends" (Parry, 1997, p.3).

2 Including agriculture, fisheries and forestry.

3 In Canada, for instance, where mineral exports still account for a significant share of the total, the mining sector has extensive backward and forward linkages, and the accumulation of geological knowledge has allowed native firms to explore mineral resources elsewhere and to export geophysical services and equipment (Ritter, 2001). In the developing world, however, even in countries where the mining sector significantly contributes to investment, production and exports, the mining sector typically exhibits relatively low linkages with the domestic economy (see Buitelaar, 2001, for Latin America; Stilwell et al., 2000 for South Africa). Even in the few which have done very well overall, and where innovation has become a productivity driver (e.g. Chile; see Nishiyama, 2005; and García, Knights and Tilton, 2001), the majority of local suppliers provide goods and services which are not essential to the competitiveness of the large mining firms. As the latter procure this type of relatively undifferentiated goods and services on a cost-minimization basis, small firms are marginalized, and domestic goods face steep competition from imported supplies. Furthermore, downstream activities, such as copper refining, are still incipient (Culverwell, 2001).

4 This is the case of cotton, of which China is an important importer but also producer. International demand is however expected to pick up again as demand for cotton in China (and India) expands following the end of the Multi-Fibre Arrangement.

5 Thus, the higher the average income of the exporter, the higher the degree of sophistication, the underlying logic being that in the absence of policy-induced trade barriers, the goods exported by richer countries will have certain specificities (e.g., related to technology content, marketing, logistics, information and familiarity, infrastructure and value-chain organization) that let high-wage producers withstand competition in world markets, i.e., where competition is not primarily based on price.

6 Data are from the World Development Indicators online database.

7 Product categories are: Primary (which we further separate into agricultural, fuel and other minerals), Resource-based (agro-based and other), Low technological content, Medium technological content and High technological content. A small group of commodities which do not fit any of the categories are excluded from the analysis. Lall classified organic chemicals in other resource-based manufactures, rather than agro-based, and thus we classified crude organic fertilizers in primary mineral products, rather than agricultural.

8 Fish is the paradigmatic example of a commodity that does not typically increase its unit value when it is processed, with the exception of the value-adding process of filleting.

9 Authors' calculations, based on UN COMTRADE data.

10 "Wal-Mart eyes organic foods", The New York Times (12/May/2006).

11 While Vietnam is currently a small producer of cocoa by world standards, its production is expected to expand significantly over the medium-term, as farmers respond to declining coffee prices by replacing or supplementing coffee with cocoa in land deemed to be highly suitable for its cultivation (USDA, 2003).

12 Including allocation of cooperative land to farm households, legalization of private ownership of productive assets, deregulation of agricultural marketing and prices, and devaluation of the exchange rate.

13 Authors' calculations based on COMTRADE data.

14 The total area planted by small farmers now accounts for more than half of the total in that country.

15 Sugar production in the EU is however expected to decline as a result of reforms of the sugar regime which came into effect in July 2006 (FAS-USDA, World Sugar Situation 2006).

16 Although full liberalization under EBA for sugar will only take place in 2009.

17 Authors' calculations based on COMTRADE data.

18 Authors' calculations based on COMTRADE data.

19 US Mission to the EU

(http://www.useu.be/Categories/Bananas/Index.htm).

20 Authors' calculations, based on COMTRADE data.

21 Authors' calculations, based on COMTRADE data.

22 USDA-FAS, Official estimates for May 2006 (http://fas.usda.gov/psd/complete_tables/CO-table11-177.htm).

23 This group includes bananas, which were discussed in the previous section.

24 Nes = not specified elsewhere (this category includes macadamia nuts, among other edible nuts, of which South Africa is the second largest exporter after Australia).

25 Authors' calculations, based on COMTRADE data.

26Authors' calculations, based on COMTRADE data.

27 This average includes only expenditures through the regular budget, excluding therefore those incurred by public development banks, which are very sizeable in countries like Brazil or Costa Rica.

28 Now called ChileAlimentos.

29 Good agricultural practices comprise a set of measures implemented at farm level in order to meet certain environmental, health, worker's welfare and sanitary standards. These are formally required by large food retailers in Europe and the United States since 1997, and today Chilean exporters require their suppliers to have them in place. Good manufacturing practices are similar, but pertain to agricultural processing plants ("Nuestra Tierra" Magazine, Chilean Ministry of Agriculture, July 2003).

30 Salmon refers to salmon and trout, unless otherwise indicated.

31 Authors' calculations, based on figures in UNCTAD (2006).

32 The processing of salmon into fillets is labor intensive and Chile benefits from labor costs lower than those prevailing in its main competitors, Norway and Scotland (UNCTAD, 2006).

33 This is the largest non profit organization fostering innovation and technology transfer in the country, founded in 1976 by the Chilean government and the US-based ITT corporation.

34 The equipment utilizes a method that produces brain death in the salmon but otherwise allows it to maintain its physiological functions (http://www.fundacionchile.cl).

35 SIGes combines locally created standards with modified global standards.

36 Established in 2003 by several salmon industry associations in Canada, the US and SalmonChile in Chile.

37 The country now ranks third, after Indonesia (Malaysian Palm Oil Board, http://econ.mpob.gov.my/economy/world_8.htm).

38 Kenaf is a fiber-producing plant which is used for the manufacture of pulp and paper products. It is considered one of the most promising alternatives to wood for paper production (Taylor, 1993).

39 "To encourage new investments in 'halal' food production for the export market and to increase the use of modern and state-of-the-art machinery and equipment in producing high quality 'halal' food that comply with the international standards, companies which invest in 'halal' food productions and have already obtained 'halal' certification from JAKIM are eligible for the Investment Tax Allowance of 100 per cent of qualifying capital expenditure incurred within a period of 5 years" (Malaysian Industrial Development Authority, Investor's Guide, http://www.mida.gov.my).

40 Malaysian Industrial Development Authority, Investor's Guide (http://www.mida.gov.my).

41 For the list, see:

http://www.mida.gov.my/beta/view.php?cat=3&scat=34&pg=978.

42 "First shipment of biodiesel to Europe next week"

(http://biz.thestar.com.my/news/story.asp?file=/2006/8/11/business/15112818&sec=business).

43 "Malaysia weighs palm oil share for food, energy" (http://www.planetark.com).

44 This finding cannot be attributed to structural factors, since the observed relationship between discovery and income per capita does not significantly differ across sectors.

45 Average tariffs (including ad-valorem equivalents of specific duties) are highest in the EU and developed Asia for a broad range of products, while in the United States (and Canada) tariff protection is concentrated in a few sectors, including sugar, dairy and tobacco.

46 The WITS database was used. At the time of writing, the most recent year for which ad valorem equivalents were calculated was 2001, and thus the average tariffs presented are for 2001. Since then, South Africa has signed a free trade agreement with the EU, so these averages are probably lower. Non LDC countries in Africa are Botswana, Cameroon, Congo, Gabon, Ghana, Kenya, Mauritius, Namibia, Nigeria, Seychelles, South Africa, Swaziland and Zimbabwe.

47 UNCTAD's Trade Analysis and Information System.

48 Including price control measures, quantity restrictions, monopolistic measures and technical regulations.

49 Based on survey data, findings from several OECD reports show that the agriculture and food sectors account for the largest number of NTB complaints in relative terms, followed by mining and textiles (UNCTAD, 2005).

50 Importation of fresh meat derived from domestic and wild ungulate (hoofed) animals", European Commission

(http://europa.eu.int/comm/food/animal/animalproducts/freshmeat/index_en.htm).

51 http://www.fsis.usda.gov/regulations_&_policies/Eligible_Foreign_Establishments/index.asp.

52 HACCP=Hazard Analysis and Critical Control Point. African countries allowed to export fish and fish products to the EU are: Cape Verde, Gabon, Gambia, Ghana, Guinea, Ivory Coast, Kenya, Madagascar, Mauritania, Mauritius, Mozambique, Nigeria, Seychelles, Senegal, South Africa, Tanzania and Uganda. In the US, the responsibility to verify that that the fish and fish products comply with HACCP principles and US regulations for the "Safe and Sanitary Processing and Importing of Fish and Fishery Products" falls on the importers. One way in which importers may satisfy their verification obligation is to obtain products from a country that has an equivalence agreement with the US covering fish and fish products. As no such agreement exists with African countries, importers must take "affirmative" steps [e.g. obtaining a certificate from an appropriate foreign government inspection authority attesting that the products were produced in accordance with US requirements ("Fish and Fishery products: affirmative steps", US Food and Drug Administration,

http://cfsan.fad.gov/~frf/sfimport.html)].

53 Nile perch is the most important commercial species in Uganda. It was introduced in Lake Victoria during the colonial period and was initially sent to Kenya for processing. This ended in 1991 when the Ugandan government banned exports of unprocessed whole fish to Kenya.

54 http://www.unido.org/userfiles/timminsk/LDC3uganda.pdf.

55 New technical barriers are constantly emerging. For instance, in the US, the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 increased the stringency of food (and drug) import requirements with respect to traceability (e.g. all companies supplying food products to the US must register with the Food and Drug Administration and must keep records related to processing, packaging, distribution and so forth for a 2 year period) and container security (the Container Security Programme, CSI, requires that container content be monitored prior to arrival in the US; due to the high costs of the necessary equipment, most ports in developing countries are not CSI compliant yet, and thus shipments have to be monitored in US ports, a process which takes between 2 and 6 days) (UN-ECLAC, 2004).

56 KEPHIS is seeking recognition by the European Commission as a "competent authority" (meaning that most inspection responsibilities would be delegated to KEPHIS thereby facilitating the entry of Kenyan exports into the EU).

57 Annual growth rates in market shares over the 1990-2004 period were, respectively, -64.5 per cent, 391 per cent and 11 per cent, based on UN-COMTRADE data. As a reference, Latin America held a 45 per cent market share in China's imports of agricultural products as of 2003 (up from rough-

ly 28 per cent in 1995). In India, the region's market share increased from roughly 7 per cent to 20 per cent over the same period (UN-ECLAC, 2005).

58 While India remains an incipient importer overall, for some countries and some products it is an important trading partner (e.g. cotton from Sudan and Cameroon; fruits and vegetables from Ethiopia, Ghana and Tanzania; fruits and nuts from Mozambique) (Goldstein et al., 2006).

59 Authors' calculations, based on COMTRADE data.

60 East African Business Week, May 29, 2006: "Fish exporters begin to look to value addition".

61 Authors' calculations, based on UN-COMTRADE data for 2004.

62 "Ethiopia: the next production hot spot", FloraCulture International, May/June, Vol.16 (3), by N. Laws.

63 Mauritius being an outlier, in that handling and transport take only half a month on average, just slightly above the average for developed countries. On the other extreme, export time reaches 116 days in the Central African Republic.

64 This expression is used in the OECD paper in relation to the inability to re-create the Green Revolution in Africa.

65 Even in the US, where a well-developed patent system exists, it is estimated that "seed companies retained only 30-50 per cent of the economic benefits from enhanced hybrid seed yields and only 10 per cent of benefits from non-hybrid seed during 1975-90" (Fuglie et al., 1996, quoted in Kremer and Zwane, 2005).

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