



# The State of Agricultural Commodity Markets *IN DEPTH*

## Value chains, agricultural markets and food security<sup>1</sup>

### What are the issues?

There have been major growth and structural changes in global agri-food value chains with major implications for international trade and food security.

Global value chains have been significantly affected by changes in agricultural and food standards. Such standards are spreading rapidly and food production and trade are increasingly regulated through stringent public and private requirements on food quality and safety, and ethical and environmental aspects (Jaffee and Henson, 2005; Henson and Reardon, 2005).

The use of both public and private standards is increasing. An illustration of the rapid increase in public food standards is the number of notifications of new SPS measures to the WTO. These have increased exponentially in the last 15 years (from a few hundred in the mid-1990s to almost 13,000 in 2011). Private standards are often more stringent than public ones (Fulponi, 2007; Vandemoortele and Deconinck, 2014). An illustration of the spread of private standards is the number of producers that are GlobalGAP certified. This number increased six-fold over the past decade and a half: from around 20,000 in the mid-1990s to around 120,000 in 2011 (Maertens and Swinnen, 2015).

Yet, global agricultural trade has increased sharply during the past three decades. Moreover, the growth has been strongest in sectors where standards are most important, i.e. in the higher value products – which includes fruits, vegetables, seafood, fish, meat

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and dairy products. The shift towards high-value exports has been most dramatic in developing regions (Maertens and Swinnen, 2015). In Asia and in Latin-America, high-value products increased from around 20 percent of agricultural exports in the 1980s to around 40 percent. The process is similar, albeit slower, in Africa.

At the same time, (foreign) investment at various stages of these value chains has increased significantly. Increased foreign direct investment (FDI) has been triggered by several factors. The first reason is the wave of investment liberalizations in the past 20 years which have made it easier for FDI to flow in. The second reason is strong economic growth in emerging and developing countries, which has triggered increases in demand for higher quality products and for retail and processed products in urban areas due to growing urbanization as part of the economic development process. The best documented effect on FDI has been the rapid increase of investments in the food retail sector over the past decades, and the associated process of concentration in the retail sector. This led to the so-called 'supermarket revolution' as large retail chains increasingly invested in emerging and developing countries (Dries *et al.*, 2004; Reardon *et al.*, 2003).

In combination, these developments have resulted in changes in the way global agricultural value chains are organized with increasing levels of vertical coordination,

upgrading of the supply base and increased dominance of large multinational food companies (McCullough *et al.*, 2008; Swinnen and Maertens, 2007).

These processes have important implications for international trade and food security. Increased demand for high-value products and increasing prices in international food markets create opportunities for developing countries to realize economic growth through expanding and diversifying their agricultural exports. High-value agricultural exports entail an important potential for raising rural incomes and reducing poverty because of the high intrinsic value and labour-intensive production systems (Aksoy and Beghin, 2005; Anderson and Martin, 2005).

Agricultural trade and value chains entail the potential to increase rural incomes and reduce rural poverty (Jaud and Kukučová, 2011). This note looks at some of the implications of these global agri-food value chains for food security and poverty reduction by focusing on the following aspects which directly and indirectly affect food security: (a) smallholder inclusion in value chains; (b) impacts on smallholder's income and food security; (c) technology transfer and access to inputs; (d) labour market effects and impacts on gender and rural poverty; and (e) the interaction between liberalization policies and value chains.<sup>2</sup> The conclusions summarize the key insights and refer for more detailed analyses to a series of studies that are listed in the reference list.

## Smallholder inclusion in value chains

An important way through which rural farm-households in developing countries can benefit from agri-food exports and the increased value in export sectors is through participating in contract-farming with exporters or overseas buyers. But whether or not smallholder farmers do share in the benefits from trade depends on the extent to which they are included in contract-farming arrangement and the impact that participation in contract-farming has on their incomes and well-being.

There is widespread concern that the structural changes (including tightening product and production standards) may lead to the exclusion of smallholder farmers from contract-farming schemes and hence from supplying to value chains. Contract-farming schemes may be biased

towards larger farms because of smaller transaction costs in buying larger quantities from few suppliers (Key and Runsten, 1999). Standards might play an important role in inducing this shift towards vertical integration or sourcing from larger suppliers, and hence in the exclusion of smallholders. Small farms might be unable to comply with stringent requirements due to a lack of technical and financial capacity (Reardon *et al.*, 2001), which may induce traders and processing firms to reduce (or cease) sourcing from small suppliers.

<sup>2</sup> On the use or effect of standards as non-tariff barriers for international trade, see Beghin (2013), Beghin *et al.* (2015) and special issues of the *World Trade Review* (guest edited by Heckelev and Swinnen in 2012) and the *World Economy* (guest edited by Beghin and Orden in 2012).

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Also, transaction costs for monitoring compliance with standards might be very high in the case of sourcing from smallholders.

On the other hand, standards are themselves instruments for harmonizing product and process attributes over suppliers, and can as such also reduce transaction costs in dealing with a large number of small suppliers. Moreover, well-specified contracts include farm extension and assistance programmes that can alleviate the financial and technical constraints small farmers face in meeting stringent standards. In addition, firms might prefer to contract with smaller farms because they might have a cost advantage – especially if it concerns labour intensive production with relatively small economies of scale, such as fresh fruit and vegetable production – or because contract enforcement might be less costly with small suppliers.

While some studies show that smallholders continue to be included in modern value chains, sometimes exclusively, the empirical evidence (Beghin *et al.*, 2015; Maertens *et al.*, 2011; Reardon *et al.*, 2009 for surveys

of the empirical literature) yields a mixed picture on the exclusion/inclusion of smallholder producers in global value chains through contract-farming schemes across sectors and countries.<sup>3</sup> However, in itself this indicator says little about the impact on poverty or food security.

Xiang *et al.* (2012) simulate the general equilibrium effects of the growth of trade and standards on household welfare. Their simulation results show that an increase in the worldwide or domestic demand for high standard food leads to an increase in the production of high standard products and to a reduction of poverty and inequality. They show that the impact of export demand is more likely to lead to poverty reduction than the growth of domestic demand for higher value products since the growth of domestic demand can lead to increased imports, leaving poor local producers in low value local markets. The study illustrates the importance of taking into account that the growth and equity effects of high standards are determined by a complex set of factors and mechanisms that are often ignored in the empirical literature.

## Poverty impacts and efficiency premia in smallholder contract-farming

How the participation of smallholder farmers in high-standards value chains and international trade contributes to rural income mobility and poverty reduction depends on whether and how much contracted suppliers effectively benefit from this participation. It has often been argued that the gains from high-standards agricultural trade are captured by foreign investors, large food companies and developing country elites (e.g. Dolan and Humphrey, 2000; Reardon *et al.*, 1999). On the one hand, vertical coordination mechanisms and consolidation at the buyer end of export chains are said to amplify the bargaining power of large agro-industrial firms and food multinationals, displace decision-making authority from the farmers to these downstream companies, and strengthen the capacity of these companies to extract rents from the chain to the disadvantage of contracted smallholder suppliers in the chains (Warning and Key, 2002).

However, several empirical studies find evidence that is in contrast with these predictions. They have found that once farmers are included in contract schemes and high-value export chains, they benefit significantly. In certain export sectors, smallholder farmers even became

<sup>3</sup> To explain these different patterns of smallholder inclusion, Vandemoortele *et al.* (2012) develop a formal theoretical model of the emergence of the demand for high quality and safe food and analyse which small producers are most likely to be included. They show the role of the initial production structure in the economy and the nature of transaction costs. Their model predicts that in a mixed production structure, smallholders are more likely to be excluded. When the farm sector is more homogeneous and dominated by small farms, it is likely that the emergence of high value production will be slower but more inclusive. These predictions/arguments correspond to the conclusions by Reardon *et al.* (2009) and Maertens *et al.* (2011) who, based on the existing empirical studies, find that smallholders are especially excluded if sourcing from large farms is an option.

certified themselves – often with the assistance of contractor companies and/or donors. In the Senegalese horticulture sector it is found that contract-farming leads to important increases in rural households' income – and significant declines in poverty. Handschuch *et al.* (2013) Asfaw *et al.* (2009) and Subervie and Vagneron (2013) find that smallholders' certification to GlobalGAP results in improved quality, increased volumes, higher farm-gate prices and higher net incomes from fruit or vegetable production for respectively Chile, Kenya and Madagascar.<sup>4</sup>

Swinnen and Vandeplass (2011) and Swinnen *et al.* (2015) develop a theoretical model to show why

buyers may pay suppliers an extra “efficiency premium” in high value chains, even with very unequal bargaining power in the contract relationship. The demand for higher quality products requires buyers to assist farmers in order to improve the quality of production, for example by providing the farmer with inputs on credit. In a context of weak contract enforcement, which is likely in many developing countries, this creates holdup opportunities, forcing buyers to offer attractive contract terms in order to secure their returns to investment. Hence, poor suppliers can benefit from the introduction of quality standards in a weak contract enforcement context, even if all bargaining power lies with the buyer.

## Technology transfer and access to inputs through value chains

Successful contract-farming typically involves technology and input transfers since local suppliers do not have access to the required technology, capital, inputs etc. In many cases to make these value chains functioning, this requires farm assistance programmes, which can help to overcome constraints of local producers with limited access to capital and technology.

Several empirical studies document these technology transfers and the resulting productivity increases (Dries and Swinnen, 2004, 2010; Gow and Swinnen, 2001; Maertens and Swinnen, 2009a; Minten *et al.*, 2009; Negash and Swinnen, 2013).<sup>5</sup> These studies find that technology (and management) transfer through value chains generates significant productivity increases both for the product itself and for other production activities at the farm level.

This improved access to inputs can have important spillovers on household food security. Minten *et al.*, 2009 find that high-standards vegetable export production in Madagascar is entirely based on small-scale contract farming, including thousands of very poor farmers. By generating higher incomes, and because of technology spillovers on food production, income stability and the food security of participating households improves with participation in the export chains. A crucial factor is that the better technology and management practices related to contract-farming spill over to other crops, generating large productivity increases in rice production, and further improving the food security situation of rural households. These effects are the strongest for the poorest farmers and farmers in remote areas since their access to fertilizer and other inputs is most constrained.

The use of pesticide as one of the crucial inputs in agricultural production also affects producer welfare. Asfaw *et al.*, 2010 find improved health outcomes among farmers as a result of the use of less toxic pesticides and improved farmers' pesticide management as specified in GlobalGAP requirements. As health is an important element in food security (FAO, 2012), these effects may have indirect impacts on food security.

<sup>4</sup> Asfaw *et al.* (2010) finds improved health outcomes among farmers as a result of the use of less toxic pesticides and improved farmers' pesticide management as specified in GlobalGAP requirements.

<sup>5</sup> Similarly, Negash and Swinnen (2013) find positive effects on food security of smallholder biofuel value chains in Ethiopia because of spillover effects through fertilizer access.

## Benefits for the poorest through labour markets

An important – and much overlooked – issue in the welfare analyses of agri-food trade and value chains is that poor households may benefit through employment effects. High-standards trade creates new employment opportunities in labour-intensive processing and handling of produce, and on vertically integrated estate farms and large contracted farms. A shift from smallholder contract-farming to vertical integrated estate farming also entails a shift from production based on family labour to production based on hired labour. Hence, there might be additional benefits from agri-food trade through employment effects.

The empirical evidence on this issue is scarce but some recent empirical studies have documented that the development of such high value agro-industrial value chains creates substantial employment, for example in vegetable export sector in Senegal (Maertens and Swinnen, 2009b; Maertens *et al.*, 2011 and in the cut flower industry in Ethiopia (Mano *et al.*, 2011). Employment in agro-industrial production and exporting companies appears to be especially important for the poorest because they lack land for contract-farming and that this employment can have large positive effect on household incomes and on poverty reduction.

The increase in standards may also create improved employment conditions for workers. Ethical or fair trade standards may generate positive effects on working conditions. For example, Barrientos *et al.*, 2003 find that labour standards and codes-of-conduct can improve workers' well-being, although not in all cases. Yet, even food quality and safety standards may generate benefits for workers. By increasing the need for companies to invest in training, standards may result in higher wages through an efficiency premium paid to trained workers in order to stimulate them to keep working at that same company. Colen *et al.* (2012) find evidence of increased employment periods and higher wages for workers, following companies' certification to private standards in the horticulture export sector in Senegal.

Moreover, there seems to be a high demand specifically for female labour in these export sectors (Maertens and Swinnen, 2012). Besides the direct effects, this further results in indirect effects such as increased child schooling (Maertens and Verhofstadt, 2013). By creating off-farm employment opportunities for women, agri-food export sectors contribute significantly to female empowerment in rural households. This may also have important (additional) food security implications if gender-differentiated access to income and household affects spending on food and health items.

## Trade liberalization and value chain organization

Another way how value chains affect economic development is through their interaction with economic policies, such as trade liberalization. This it is not always understood very well, but it can have major implications. In particular the vertical organization of the value chain may play a very important role in determining the effects of policy changes. In Swinnen *et al.* (2011) we document how various agricultural commodities in Africa have reacted quite differently to the liberalization processes in the 1980s and 1990s, and that these output and productivity responses were not consistent with the simple "getting prices right" model predictions. For example, fruits and vegetables and staple crops have performed much better than industrial crops (such as cotton, tea, cocoa, coffee,

sugar). After a decade and a half of liberalization, output and productivity had increased significantly for fruits and vegetables and staple crops. Instead, per capita output had declined for industrial crops.

The differences in performance cannot be explained by price changes but are consistent with a model of vertical coordination in value chains as developed in Swinnen and Vandeplas (2011). In the industrial crop sectors, the lifting of price controls and trade restrictions, combined with increased competition, also caused a collapse in state-controlled vertical coordinated input provision to farmers. This contrasts with strong growth in the fruits and vegetables sector because of two mechanisms. First, production of

low-value fruits and vegetables for the local market depended largely on labor inputs and thus benefited from price increases without input market disruptions. Second, an important—and rising—part of the growth came from high-value fruits and vegetable chains for exports. This sector grew very rapidly after the reforms. The high value in these chains sustained post-reform private investments in the sector and encouraged private vertical coordination with quality upgrading, interlinking, and input provision to farmers.

In this perspective, the recent increases in food prices may have caused a “double whammy” effect in African agricultural markets: it increases the profitability of investing in agricultural production and it enhances the capacity to enforce contracts—and thus access to inputs—in the value chain. This appears consistent with recent data on food production in Africa, which suggest that the price increases have caused strong growth

responses which have been particularly sharp in some subsectors including cereal and industrial crops, sectors which were lagging behind in the earlier liberalization period (Swinnen and Janssen, 2015).<sup>6</sup> The growth has come both from an increase in area and, mostly, from an increase in productivity. Cereal yield growth in recent years is three times higher than before the food price increases (Swinnen and Janssen, 2015).

In summary, the different experiences of these commodities in Africa are consistent with the arguments that the nature (and the endogenous emergence) of value chains are crucially important for understanding agricultural sector performance, poverty and food security effects.

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<sup>6</sup> Cereal per capita production growth increased from 0.4 percent in the 1990–2006 period to 4.7 percent per year in recent years.

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