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Global Agricultural Value Chains, Standards, and  
Development

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**Robert Schuman Centre for Advanced Studies**  
Global Governance Programme

## **Global Agricultural Value Chains, Standards, and Development**

Johan Swinnen

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## **Abstract**

Understanding the development implications of agri-food value chains is crucial as they are a fundamental component of developing countries' growth potential and could increase rural incomes and reduce poverty. This note reviews some of the implications of these global agri-food value chains for developing countries and global poverty reduction. I focus on five aspects: (a) smallholder inclusion in value chains; (b) impacts on smallholder income and food security; (c) technology transfer and access to inputs; (d) labor market effects and impacts on gender and rural poverty; and (e) the interaction between liberalization policies and value chains.<sup>1</sup> I summarize key insights and provide references to a rapidly growing literature.

## **Keywords**

Value Chains, Agriculture, Food, Standards, Development, Poverty, Trade, Foreign Direct Investment

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<sup>1</sup> One important issue which I do not discuss here is the use (or effect) of standards as non-tariff barriers for global trade. I refer to Beghin (2013) and special issues of the *World Trade Review* (guest edited by Heckelevi and Swinnen in 2012) and the *World Economy* (guest edited by Beghin and Orden in 2012).





## 1. Introduction\*

There have been major growth and structural changes in global agri-food value chains with major implications for economic development.

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).<sup>2</sup>

Both public and private standards are 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 & 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, 2014).

Yet, despite these more stringent and more widespread standards, global agricultural trade has increased sharply during the past three decades. Moreover, the growth has been strongest in where standards are most important, i.e. in the higher value products – which includes fruits, vegetables, seafood, fish, meat and dairy products. The shift towards high-value exports has been most dramatic in developing regions (Maertens and Swinnen, 2014). In Asia and in Latin-America, high-value products increased from around 20% of agricultural exports in the 1980s to around 40%. 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, with growing urbanization as part of the economic development process, and increasing demand for retail and processed products in urban areas. 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 lead 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).

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\* Many of the insights presented in this paper are based on research collaborations and discussions with colleagues and (former) students. I want to thank in particular Liesbeth Dries, Hamish Gow, Miet Maertens, Bart Minten, Tom Reardon, Scott Rozelle, Anneleen Vandeplass and Thijs Vandemoortele.

<sup>2</sup> Food standards have increased sharply during the past two decades and now play a dominant role in world agri-food trade (Aksoy and Beghin, 2005). A number of factors contribute to explaining their recent increase (Maertens and Swinnen, 2007). First, a series of major food safety hazards in high-income countries has increased consumer and public concern on food-borne health risks and created an increased demand of food safety. Second, rising income levels and changing dietary habits have increased the demand for high quality food. Third, consumers are also increasingly (made) aware of ethical and environmental aspects related to food production and trade, which has increased the need for specific standards related to these aspects. Fourth, the increased trade in fresh food products such as fruits, vegetables, meat and dairy products – which are either prone to food safety risks or subject to specific quality demands by consumers – have increased the need to regulate trade through standards. Fifth, the increased role of large multinational food and retail companies contributes to the increased importance of private food standards. Large retail chains put much emphasis on freshness, product quality and food safety (with potentially high reputational damage and loss in market shares from selling unsafe food (Henson and Humphrey, 2008).

In combination, these developments have resulted in changes in the way global agricultural value chains are organised 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 developing countries. 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). Many developing countries recognize the opportunities of the development of high-value agri-food chains as an important strategy to foster pro-poor growth.

Understanding the development implications is therefore crucial, as agricultural value chains are a fundamental component of developing countries' growth and entail the potential to increase rural incomes and reduce rural poverty (Jaud and Kukenova, 2011). In this note I review some of the implications of these global agri-food value chains for developing countries and global poverty reduction. I focus on five aspects: (a) smallholder inclusion in value chains; (b) impacts on smallholder income and food security; (c) technology transfer and access to inputs; (d) labor market effects and impacts on gender and rural poverty; and (e) the interaction between liberalization policies and value chains.<sup>3</sup> I summarize key insights and refer for more detailed analyses to a series of studies that are listed in the reference list.

## 2. Standards and 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. 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 programs that can alleviate the financial and technical constraints small farmers face in meeting stringent standards. In fact, high-standards contract-farming with tight contract-coordination and intensified farm assistance programs could provide a basis for constrained small farmers to participate in high-value export production. In addition, firms might prefer to contract with smaller farms because they

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<sup>3</sup> One important issue which I do not discuss here is the use (or effect) of standards as non-tariff barriers for global trade. I refer to Beghin (2013) and special issues of the *World Trade Review* (guest edited by Heckelevi and Swinnen in 2012) and the *World Economy* (guest edited by Beghin and Orden in 2012).

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.

The empirical evidence is mixed (Maertens et al 2012; Reardon et al 2009). Several empirical studies have documented that with increasing standards, a decreasing share of export produce is sourced from small farmers. For example, studies find decreased inclusion of smallholders in food export chains in Kenya (Gibbon, 2003; Jaffee, 2003; Dolan and Humphrey, 2000) and Cote d'Ivoire (Minot and Ngigi, 2004; Unnevehr, 2000). Subervie and Vagneron (2013) describe the rise of large exporter-owned lychee plantations in Madagascar in response to rising private standards. Maertens and Swinnen (2009) document a shift from smallholder contract farming to vertically integrated farming on large-scale plantations in the vegetable export sector in Senegal with the increased importance of private standards, especially GlobalGAP. Also Schuster and Maertens (2013) conclude that the spread of private standards, especially production standards such as GlobalGAP, in the Peruvian asparagus export sector has led to decreased sourcing from smallholders and that certified companies source significantly less from smallholders than non-certified companies. Some export sectors are even completely based on vertically integrated agro-industrial farming, without any inclusion of smallholder suppliers, e.g. the tomato export sector in Senegal (Maertens et al 2011).

Yet, other studies show that smallholders continue to be included in modern value chains, sometimes exclusively. For example, several studies from Eastern Europe document that small farmers were integrated in modern agricultural value chains (e.g. Dries and Swinnen, 2004; Dries et al 2009; Noev et al 2011). Also in Africa and Asia smallholders have been successfully integrated in several value chains. Minten et al (2009) find that the vegetable export sector in Madagascar includes 10,000 smallholder farms and is based entirely on an intensive contract-farming systems. Other examples where smallholders are to a large extent included in high-value export chains through contract-farming with buyers and exporters include fruit and vegetable sectors in Zimbabwe (Henson et al., 2005), Chile (Handschoch et al., 2013) and Thailand (Kersting and Wollni, 2012). Also in Asia smallholders play an important role in these value chains. For example, export horticulture chains in China are found to be based almost completely on smallholder contract production (Wang et al., 2009). Gulati et al (2007) show that in many value chains in Asian countries there is an overwhelming predominance of smallholder producers based on contract-farming and innovative vertical coordination schemes.

In summary, the empirical evidence yields a mixed picture on the exclusion/inclusion of smallholder producers in global value chains through contract-farming schemes across sectors and countries.

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 that conditional on the initial production structure in the economy, the nature of transaction costs, and the possibility of contracting between producers and processors, certain producers are included in the high quality economy, and others are not. Their model predicts that in a mixed production structure, with both smallholder farms and larger farm enterprises, 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) who, based on the existing empirical studies, find that smallholders are especially excluded if sourcing from large farms is an option. They argue that reducing specific transaction costs (for example by investments in infrastructure, producer associations, third party quality control) can enhance the integration of small and less efficient producers in high-value value chains.

### **3. Poverty and Food Security Impacts of Smallholder Contract-farming: Efficiency Premia and Spillovers**

How the participation of smallholder farmers in high-standards export production and 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 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. 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. 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) 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 for the farmer, who can decide to use the inputs but sell the high-value product to another buyer without paying back the credit that the first buyer offered him. In order to prevent this, buyers are forced to offer attractive contract terms in order to secure their returns to investment, for example by offering the farmer a price premium. 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.

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. Asfaw et al. (2010a) 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.

Xiang et al. (2012) simulate the general equilibrium effects of the growth in high standards food 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. But the study especially illustrates the importance of taking into

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<sup>4</sup> Asfaw et al. (2010a) 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.

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.

#### **4. Technology Transfer and Access to Inputs Through Value Chains**

Successful contract-farming typically involves technology and input. A crucial component in the benefits for local development is transfers since local suppliers do not have access to the required skills, know-how, technology, management, capital, inputs etc. In many cases to make these value chains functioning, this requires farm assistance programs, which can help to overcome constraints on domestic firms in low-income countries with limited access to capital and technology.

Several empirical studies document these technology transfers and the resulting productivity increases: see e.g. Dries and Swinnen (2004, 2010), Gow et al (2001), Maertens and Swinnen (2009), 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. For example, Minten et al (2009) also find 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.

#### **5. Benefits for the Poorest and for Women Through Labor Markets**

An important – and much overlooked – issue in the welfare analyses of agri-food trade 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, 2009; Maertens, Colen and Swinnen, 2012) and in the cut flower industry in Ethiopia (Mano et al., 2011). In the vegetable export sector in Senegal, it is found that employment in agro-industrial production and exporting companies is well-accessible for the poor and that this employment has a 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. (2012a) 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

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<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.

increased child schooling (Maertens and Verhofstadt, 2013) and investment spillovers (Maertens, 2009). By creating off-farm employment opportunities for women, agri-food export sectors contribute significantly to female empowerment in rural households.

## **6. Value Chains and (Trade) Liberalization**

Another way how value chains affect economic development is through their interaction with economic policies, such as liberalization strategies. 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. The nature of exchange institutions in value chains, and in particular the role of vertical coordination, compared to spot markets (which are the typical exchange institution used in text books and in many trade models) can matter very much, in particular in environments where contract enforcement is difficult.

In Swinnen, Vandeplas and Maertens (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 lack of output growth and productivity in industrial crops in Sub-Saharan Africa is often attributed to falling world prices for these commodities. Indeed, during the 1980s—when most Sub-Saharan Africa countries embarked on economic and agricultural reforms—prices for these commodities deteriorated sharply.

However, these price effects cannot explain the variation across commodity groups in Sub-Saharan Africa. According to a World Bank (1994) study, real producer prices for export crops rose during the 1980s in some Sub-Saharan African countries because the effects of price liberalization offset the effects of decreasing world market prices. This argument is supported by recent estimates of nominal rates of assistance (Anderson and Masters 2009) indicating that the effect of the liberalization on prices was most positive for industrial crops. Taxation of industrial crops actually fell by around 30 percentage points (from –40 percent to –10 percent) over the decade and a half after the start of the reforms. The reduction in taxation—and hence the enhanced price incentive—was substantially lower for the other commodity groups: around 20 percentage points for fruits and vegetables and 5–10 percentage points for staple crops. If anything, these relative price changes would predict the opposite in terms of relative performance.

The differences in performance are, however, consistent with our model of vertical coordination in value chains as developed in Swinnen and Vandeplas (2011). For staples input requirements are generally low and therefore output growth has not been very dependent on VC. Instead, the sector benefited from liberalized prices and enhanced competition in spot markets, where many small private traders exchange products (Coulter and Poulton 2001; Fafchamps and Minten 2001).

In contrast, in the industrial crop sectors, the simultaneous lifting of price controls, introduction of competition, and associated collapse in state-controlled vertical coordination have caused major disruptions in input provision to farmers and led to below average output and productivity growth, despite a much stronger reduction in taxation than in other commodity groups. Input requirements are

generally much higher in traditional export commodities than in staple food crops, and therefore the collapse of public input provision affected output and productivity much more.<sup>6</sup>

There was strong growth in the fruits and vegetables sector—much higher than in industrial crops. This sector grew because of two, quite different, mechanisms. First, production of low-value fruits and vegetables for the local market depended largely on labor inputs and thus benefited from the same effects as staple crops. 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 (with both large and small farms), and input provision to farmers. As we explained above, studies show how the vertical coordination mechanisms and their spillovers and productivity growth effects are similar to the growth mechanisms in Central and Eastern Europe (Maertens and Swinnen 2009; Minten et al 2009; Maertens et al 2011).

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 performance, development and poverty effects.

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<sup>6</sup> This is similar as in Eastern Europe after the liberalizations in the 1990s (Gow and Swinnen, 1998). Unlike in Eastern Europe, however, massive private investments with contracting and input provision did not occur in the first decade of reform in African industrial crops, impeding a rapid recovery.

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