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**TRANSFORMATION OF FOOD PRODUCTION AND DISTRIBUTION SYSTEMS**

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**(Note by the Secretariat)**

This report synthesizes the evolution of the agro-food system over the past several decades over a wide range of transition and developing economies. It describes the key changes and drivers of the evolution in the processing and retailing sectors that constitute main actors of modern food supply chains. In particular, it reviews studies undertaken on this transformation with a focus on the transition experiences of the farm sectors of Eastern European countries as well as in a number of developing countries in Asia and Latin America. The evidence is based on the selected case studies and surveys and was prepared by by Professor Jo Swinnen and Kristine van Herck of Leuven University.

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## TRANSFORMATION OF FOOD PRODUCTION AND DISTRIBUTION SYSTEMS

### Executive summary

1. The transformation of food production and distribution systems has become an issue of global importance with profound changes along the supply chain affecting both national and international markets. This report provides an overview of this transformation based on selected case studies and surveys in transition (Eastern Europe) and developing countries. It attempts to identify the main drivers of the changes in the downstream sectors and their impacts on primary producers.

2. The transformation of the agro-food system occurred in two stages with impacts on the three broad segments of the supply chain: 1) wholesaling 1960's-1990's; 2) processing, 1970's-1990s and 3) retailing 1990's to present. The transformation of each was influenced by both government policies particularly with respect to the liberalisation of investment and trade as well as the change in consumer demands with rising incomes and urbanizations. Both foreign direct investment (FDI) and domestic investment permitted firms to reap economies of scale, scope and specialisation, which were found to be very important to this transformation.

3. Over the two past decades the growing concentration of the retail sector with the expansion of multinational retailer groups investing across the globe, from Europe to Latin America and Asia. This development has influenced procurement markets facing farmers. Two main characteristics of the change were: 1)- a shift from no standards or public standards to the use of private standards as well as public ones and 2)- a shift in use from a spot market exchange in traditional wholesale markets to vertical coordination mechanisms.

4. The shift towards private standards was influenced by income growth and issue focused NGO campaigns with respect to societal concerns such as child labour, animal welfare and sustainability. The demand for higher food standards has meant that producers must meet not only public standards but also those of retailers and processors/manufacturers. Though these 'quality standards' were developed for the more affluent country consumers they have effects on the transition and the developing economies through new export requirements.

5. More recently the importance of vertical coordination along the supply chain has increased in both transition and developing countries. These arrangements provide assistance programmes particularly for small farms as was the case for dairy in the Eastern European countries.

6. The main impacts on primary producers of the transformation has been an increase in productivity and output for those with contracts as they permitted better access to inputs, timely payments and investment support. This reduces production and marketing risks and can be viewed as part of the indirect effects of contracts in vertical coordination. In addition spill over effects were found for commodities other than those under contract, such as basic food crops.

7. The emergence of the modern supply chains has also led to substantial improvement in the quality of output. They have also stimulated increases in on farm investments via guaranteed loan

programmes. Improved cash flow and access to capital provided benefits to other farm and non-farm activities particularly in countries with capital market imperfections.

8. From the literature reviewed in this report, the welfare and income effects of this global transformation for smallholders in emerging and transition economies have been overall quite positive. This is the case for those included in the chains as well as for those who are not. Spill over effects, such as increased demand for labour, farm and non-farm and for other goods and services, are often found. More research is needed however to confirm such findings. Downstream firms often introduce vertically coordinated farm assistance programs to address small farmers' constraints regarding credit and technical assistance, providing means to integrate these farmers into the supply chain. Integration into these modern supply chain means, in many cases, higher productivity, output and income, access to new technologies and innovations to upgrade quality. This process can, in many instances cases, reduce gender inequality; contribute to reduce farmers' health risks and improving the environment.

9. Governments, particularly in transition and development countries, can take action to stimulate the participation of small and poor farmers in modern supply chains. Governments can help reduce the transaction costs of dealing with small farms, enhance competition in the sector and facilitate small farm bargaining power. Effective approaches have involved investment in rural infrastructure, provision of supplier assistance programs and development of well functioning markets.

## 1. Introduction

10. The transformation of food production and distribution systems has emerged as an issue of global importance. Structural change in the production and distribution food system raises a number of questions for adjustment opportunities or strategies of individual producers as well as for impacts on commodity markets. Most experts find that the key changes in the structure and behaviour of the agro-food system have occurred in its downstream portion and note that these are ongoing. This leads to a number of questions. What are the main drivers of this downstream transformation? How or by what economic mechanisms have these been transmitted upstream to producers? What have been their impacts on the behaviour of supply, demand and price in the sector?

11. Changes in the downstream industries affect the use of capital, labour and land at the farm level though these vary in intensity across producers and sectors. In what ways and how have these been affected by the transformation? Which producers were successful in adapting to the changes and what were the key factors determining their success? How have these outcomes been circumscribed by the initial conditions regarding distribution of land, labour, technology and access to finance? To what extent has the downstream transformation affected the quality, productivity, investment and incomes of producers?

12. To better understand the dynamics and effects of the downstream sector changes on producers and sector performance in terms of supply, demand and prices overall, this report reviews a rapidly growing body of empirical research at the sector and farm level. It includes a large set of case studies and original survey work from transition and developing countries where the pace of change has generally been the most rapid and profound, such as in Poland, Hungary, Russia, Slovenia, Slovakia, Albania, Romania, Kazakhstan, China and India, among others. The surveys include information on farms, agri-business and rural households to provide a broad view of the drivers of change and their resulting impacts.

13. Finally, the report offers some concluding observations on modern supply chains, focussing on the impacts of contracting and vertical coordination in transition and developing countries. In particular, it examines the process of adapting to new demands by the agro-food industry as well as how food safety and quality standards have affected production and trade domestically and internationally.

## 2. Transformation of the agro-food industry

### *Stages in the transformation of the agro-food industry*

14. Over the past 40 years the transformation of the agro-food industry, which includes processing, wholesale, and retailing, has occurred in two stages in the transition and developing countries. The first stage, “pre-liberalization/pre-globalization,” took place mainly in the period prior to the 1980s. It concerned the public sector governed food system transformation. This was most extreme in the Eastern European (socialist system) where the government managed all stages of the food production and distribution system (Rozelle and Swinnen, 2004). However, the government played an important role in the supply chain also in other regions. For example, in Africa, governments invested heavily in parastatal organizations that provided inputs to farmers and purchased their outputs. In general, the period was characterized by government investment in the “modernization” of the food supply chain in order to shift from a traditional small-scale informal agro-food system, to a large-scale formal industrial sector; examples include government investment in municipal wholesale markets and state-run retail chains.

15. The second stage, “liberalization/globalization,” started in the 1990s and is still ongoing. This stage has seen food trade double, spurred by trade liberalization and improvements in logistics. In addition, liberalization of food processing and investment in the retail sector spurred massive foreign direct investment (FDI) and competitive domestic investments. In Eastern Europe, for example, FDI in the food

and beverage industry, doubled in the period 2003-2007 (Figure 1). Socioeconomic factors, such as rising incomes, urbanization and the private investments in the sector along with consolidation of the processing and retail sector provided the basis for the supermarket revolution and transformation of the agro-food sector.

### ***Phases in the transformation of the agro-food industry in transition and developing economies***

16. Super-imposed on those two stages, with the timing dependent on the region and often overlapping, there exist three “broad segments” of the agro-food industry transformation,: (1) wholesaling, 1960s to early 1990s; (2) processing, 1970s through the 1990s; and (3) retailing, the 1990s and 2000s.

17. The restructuring or transformation of each industry segment was driven by three similar sets of determinants (Reardon *et al.* 2009): (1) policy interventions such as public investments, domestic and international trade liberalization and openness to FDI (2) demand side factors such as urbanization, rising incomes, and reduction in consumers’ transaction costs due to more refrigerators, roads, and vehicles; and (3) FDI and domestic investments as entrepreneurs sought economies of scale, scope, and specialization.

### ***Wholesale sector***

18. The transformation in the wholesale sector generally took place in three stages. First, in the 1970s-1980s, increased investment in the diffusion and the upgrading of wholesale markets and information systems led to a rapid spread of public wholesale markets, mainly in Latin America and Asia (excluding China). These investments were important to reduce transaction costs for small farmers to gain access to growing urban markets and to integrate markets to decrease price and supply volatility for urban consumers (Abbott, 1967). Second, in the 1990s–2000s, wholesale markets became more deregulated to allow greater entry and competition. Examples include Fafchamps *et al.* (2006) for India, Natawidjaja *et al.* (2007) for Indonesia, Koc *et al.* (2007) for Turkey, and Reardon *et al.* (2007) for Mexico.

19. Finally, since 2000, the restructuring of the wholesale sector continued through (1) increasing consolidation in certain markets, both in rural (for vegetables in West Java, Indonesia, see Natawidjaja *et al.*, 2007), and urban wholesale markets (for fruit in Mexico, see Reardon *et al.*, 2007), as well as general wholesale markets (for vegetables in China, see Huang *et al.*, 2007); (2) ‘multinationalisation’ of wholesale markets and logistics, with multinational enterprises (MNEs) moving into new countries or their regions as sourcing follows their retail clients moves. (Reardon *et al.*, 2007); and (3) the emergence of “specialized and dedicated wholesalers”, which operate in a specific product categories and use vertical coordination strategies to ensure that supply met food industry requirements further downstream (Reardon and Berdegué, 2002).

### ***Processing sector***

20. Similarly to the wholesale sector, the transformation of the processing sector can be described in three stages. First, in the 1970s –1980s, governments maintained some control over the processing sector, a standard approach in planned economies of Eastern Europe as well as in most developing countries, where there was substantial government intervention (e.g. African parastatal processing firms). Second, in the 1980s and especially in the 1990s, the processing sector was liberalized and privatized. This was followed by rapid product differentiation and proliferation of private small and medium-sized processing companies, encouraged by a significant increase in the consumption of processed foods spurred by rising incomes, urbanization, and concomitant increases in the opportunity cost of women’s time. This was the case in Asia in the 1990s, (Pingali, 2006).

21. In the second half of the 1990s and 2000s, the restructuring of the domestic processing sector continued (Wilkinson, 2004), showing: (1) rapid consolidation in specific product markets, with many mergers and acquisitions of small and medium companies; (2) expansion of multinational firms under with massive inflows of FDI in the 1990s and 2000s; and (3) specialization among the surviving smaller niche processors. These trends are illustrated for the sugar sector in Slovakia (Gow and Swinnen, 1998), the dairy sector in Poland (Dries and Swinnen, 2004), the dairy sector in Brazil and Argentina (Farina and Reardon, 2000; Gutman, 2002), and the general food processing sector in India (Bhavani *et al.* 2006).

### **Retail sector**

22. The most recent and perhaps the most important transformation of the agro-food system is that of the retail sector, which has two main stages. First, in the 1970s-1980s, certain national governments invested in retail chains, such as in China, India, Russia, Mexico and Zambia (e.g., Jha, 1992; Reardon *et al.* 2009). Second, from the mid 1990s to the early 2000s, there was a rapid diffusion of supermarkets. This development was driven by large amounts of FDI and domestic private investment, privatization of parastatal retailing, trade liberalization, rising incomes and urbanization, as well as changes in the procurement system as discussed below. The spread of modern retail supermarkets occurred earliest in South America, East Asia (excluding China), and North-Central Europe and South Africa; followed by Central America and Mexico, Southeast Asia, and South-Central Europe; and finally, and most rapidly, in China, India, Russia, Vietnam, and is now emerging in Southern/Eastern Africa. In the transition countries, the emergence and spread of modern supply chains was found to be closely and positively related to the reform process which brought with it more secure property rights, macro-economic stability and contract enforcement (Figure 2) (Dries *et al.*, 2004).

23. The importance of the modern retail sector (hypermarkets, supermarkets, discount stores) rapidly increased in Eastern Europe. Figure 3 presents the recent growth of modern retail sector in Romania. In 2003 only 19% of the food purchases happened through modern supply chains, while in 2007 this percentage increased to 55%. In the Czech Republic, Slovakia and Croatia, the importance of modern supply chains also rapidly increased (Figure 4). Table 1 shows that the average market share of modern retail in Eastern Europe went from 40% to 49% in first wave countries from 1999 to 2002; in the second wave countries the share jumped from 9 to 24% over the same period, and from being negligible to 1-2% in third wave countries.

24. In Asia, there was also massive growth of the retail sector. In China, there was only one supermarket in 1990, while by 2002, there were 53 000 supermarkets and convenience stores (Table 2) (Hu *et al.*, 2004). In Thailand, annual growth in the number of modern food outlets was 11% in 2001 and 2002 (USDA, 2002). In the Philippines, the number of supermarkets has increased from 496 in 1994 to 3989 in 2001, a 30% annual growth (Digal and Concepcion, 2004). Indonesia has seen the number of supermarkets and hypermarkets grow from 237 in 1989 to 1400 in 2002 (Chowdhury *et al.*, 2004). Overall, modern retail sales increased significantly in almost all transition and developing countries (Table 3).

### **3. Concentration and market power**

25. In the literature, it is generally acknowledged that consolidation is taking place in the food industry, in high income and emerging economies. Most of this process is through mergers and acquisitions, and it applies both to food processing and retail firms (Dobson *et al.*, 2003; McCorrison, 2006; Messinger and Narasimhan, 1995). Large food companies are also increasingly going global through foreign direct investments, thereby increasing concentration outside their home markets (Clarke *et al.*, 2002). However, the empirical evidence on the extent of consolidation is less straightforward.



26. For example, the data reveal little concentration in food manufacturing at the global level for packaged food sales. The top fifty food manufacturers have a combined market share of less than 20% in global packaged food retail sales (Gehlhar, 2008). However, high concentration rates do occur for some specific products or in specific regional markets. This is largely driven by a few big multinational food manufacturers, such as Unilever, Nestle, and Danone who are selling products that exhibit pronounced brand loyalty and are market leaders in many countries (Dobson *et al.* 2001). As Gehlhar (2008) reports, food manufacturers tend to strategically focus on specific product lines “where they have inherent advantages”.

27. The concentration and market power of the retail sector is a relatively recent phenomenon. In fact, until the 1970s, even in the US and Europe, the food retailing sector was largely fragmented compared to the food manufacturing sector. For example, Sexton and Lavoie (2001) cite a summary report of the US National Commission on Food Marketing (1966) which argued that especially in grocery manufacturing, concentration had reached “undesirable high levels”. Meanwhile, Dobson and Waterson (1997) note that in 1961, the leading five firms controlled only 8-9% of national retail food sales in the UK, but this rose to 14% by 1982 and to 22% by 1992. Concentration has since increased. In the US, the combined market share of the four largest grocery retailers increased dramatically over the past two decades: from 14% in 1984 over 22% in 1994 to 55% in 2001 (Brunn, 2006; Kinsey, 1998). Clarke *et al.* (2002) report that by the mid 1990s, food retail concentration in the EU had become considerably higher than in the food manufacturing industry: the 20 largest firms account for 40 % of the aggregate retail food turnover in the EU, while the corresponding figure for the food manufacturing sector was only 15%. At the end of the 1990s, the average five-firm concentration ratio in the grocery retailing sector was close to 50% in the EU-15, but with substantial variation among EU member states. For food retail in general, Germany, the UK and Hungary have relatively high concentration ratios, with market shares held by the largest five food retailers (*i.e.* the C-5 concentration ratios) at a level of over 70% in 2006 (London Economics, 2008). More recent figures by Einarsson (2007) show that the grocery market is even more concentrated in northern Europe: the three-firm concentration ratios for 2004 are Denmark (91.2 %), Finland (79.6%), Iceland (81%), Norway (82%) and Sweden (91.2%). For Eastern Europe, Dries *et al.* (2004) provide evidence of consolidation in the retail sector and indicate that it has been mainly multinational retailers that have invested in the region.

28. The growth of global food chains has increased market opportunities for farmers in transition and developing countries. Moreover, in the presence of market imperfections and contract enforcement problems, efficiency premiums in vertically coordinated contract arrangements may provide additional benefits for farmers. Increased competition is likely to benefit farms by improving contract conditions, but may incite additional costs as contract enforcement becomes more complicated (Swinnen and Vandeplass, 2009). For example, empirical evidence on contracting in the cotton sector in Central Asia confirms the importance of competition as an important factor to protect small farms against rent extraction by large processors (Swinnen *et al.* 2007). In Kazakhstan and Kyrgyzstan, the cotton chain is characterized by strong competition among private gins buying cotton from small farms for processing, under conditions more favourable to farmers. In contrast, Poulton *et al.* (2004) conclude that in the African cotton supply chain strong competition has led to contract breakdowns. The only places where studies have found farmers to be consistently exploited are in monopolized systems, such as in Uzbekistan, Tajikistan (and Turkmenistan).

#### **4. The restructuring of the procurement system**

29. The transformation of the agro-food industry induced major changes in the product procurement systems of the retail sector. Modern procurement systems have fundamentally changed the market facing farmers.

30. Procurement system modernization includes (Reardon & Berdegué, 2002) two important elements: (1) a shift from no standards or public only standards to private standards for quality and safety which include the public criteria; and (2) a shift from spot markets in traditional wholesale markets to vertical coordination mechanisms.

### ***Shift toward increasing private standards***

31. Generally, growing demand for higher quality standards is a natural consequence of income growth. In recent years it has been reinforced by several additional factors. For example, international NGO campaigns on societal concerns (child labour, animal rights), NGO activities expressing growing concerns about climate change and the loss of biodiversity and several food safety issues (dioxin, BSE, FMD, malathion) have all contributed to increased demands for higher quality, safe, sustainable and traceable products in many countries. (Xiang *et al.* 2009). These changes in consumer demands have resulted in an increase the food standards requirements (Figure 5).

32. The demand for higher food standards has changed the way of doing business along the food chain (Kinsey, 2003). Food standards are no longer only introduced and regulated by the government, but also by processing and retailing companies, who develop their own private corporate standards (Swinnen and Vandemoortele, 2008). Fulponi (2007) illustrates the importance of private corporate standards based on a survey of 16 leading food retailers. About 90% of retailers reported that the standards they required for doing business were higher than those set by the public authorities, and about one-half reported that they were significantly higher (Figure 6).

33. Although high standards emerged initially in more advanced countries, they affect the transition and developing countries through several channels. Standards are imposed on imports from transition and developing countries and hence on the production practices in the exporting countries (Jaffee and Henson, 2004; Unnevehr, 2000). Trade liberalization in the transition and developing countries led to an increase in the participation of these countries in world agricultural trade. In addition to an increasing volume of global agricultural trade, the structure of this trade also changed considerably during the past decades. There has been an increase in the share of high-value products – mainly fish and fish products, and fruits and vegetables – in world agricultural trade (Table 4). In developing countries, high-value exports increased while the importance of traditional export commodities – such as coffee, cocoa, and tea – has decreased (Aksoy, 2005).

34. The liberalization of investment regimes attracted foreign investment in the agri-food industry. An example is the rapid growth of modern retail chains (“supermarkets”) in transition and developing countries (Reardon and Swinnen, 2004). These modern retailing companies have begun to set standards for food quality and safety in the sector wherever they do business (Dolan and Humphrey, 2000; Henson *et al.*, 2000). This rising foreign investment in processing and retailing in developing countries introduced new and higher food standards, as buyers make new demands on local producers in order to serve the high-end income consumers or to minimize transaction costs in supply chains (Reardon *et al.*, 2003a).

### ***Shift towards vertical coordination mechanisms***

35. Until twenty years ago, vertical coordination of food supply chains was widespread in transition and developing countries. This was most extreme in the socialist countries where all stages in the food production and distribution were coordinated and determined by the central command system (Rozelle and Swinnen, 2004). The state also played an important role in food supply chains in developing countries (e.g. African parastatal organizations).

36. In the 1980s and 1990s, countries in the transition region, liberalized input and output markets and privatized farms and processing companies, which caused vertical coordination along the supply chain to collapse. In many developing countries, privatization and market liberalization led to the decline of input and credit supply to farms as it dissolved the services previously provided by various government-controlled agricultural institutions, cooperative unions and parastatal processing companies without first ensuring that the private sector infrastructure was in place to replace it.

37. As a result of the privatization of the food supply chain, processing companies faced a lack of quality supplies for several reasons. Farmers may not be willing to supply their output to the processor because they fear not being paid once they deliver the product (Gow and Swinnen, 1998) or they may not be able to supply because they cannot access basic production factors (feed, fertilizer, seeds, capital, etc.). Furthermore they may only be able supply poor quality products because they lack: (a) necessary inputs to improve the quality; and (b) expertise and know-how for producing high quality outputs.

38. A strategy to address these problems typically involved some form of vertical coordination. Successful vertical contracting has taken many forms, but has typically included conditions for product delivery and payments as well as farm assistance programs for suppliers. Typically payment conditions imply immediate payment for the delivered product. Farm assistance has taken many forms including input supply programs, investment assistance programs, trade credit, bank loan guarantee programs, extension and management advisory services. Fees for assistance are typically deducted at time of delivery. Enforcement of the payments is controlled by effectively linking output and input markets - assistance programs are restricted to farms supplying to the company and part of an (implicit) contract between the farm and the company.

39. Over the past ten years, the importance of vertical coordination of the supply chain has been rapidly increasing in the transition and developing countries. In the Czech Republic, Slovakia and Hungary, 80% of the corporate farms, who dominate production in these countries, sold crops on contract, and 60-85% sold animal products on contract. These shares are considerably higher than in the US.<sup>1</sup> Besides offering a guaranteed market to farmers in transition and developing countries, these contracts often include farm assistance programs. In surveys of dairy processors in several Eastern European countries, Dries *et al.* (2009) and Swinnen (2005) find that most processors offer at least one type of farm assistance programs and many of them offer multiple types (Table 5).

40. Further east in the transition region, a survey of agro-food processors in five CIS countries (Armenia, Georgia, Moldova, Ukraine and Russia) found that food companies which used contracts with suppliers grew from slightly more than one-third in 1997 to almost three-quarters by 2003 (Gorton and White, 2007). The food processors in the sample indicated that they offer substantial farm assistance programs to their farmers (Table 6). These include prompt payments (47% of the processors offer this program), transport (45%) and credit provision (39%). Similar findings hold for the cotton sector in Kazakhstan, where Swinnen *et al.* (2007) found that 89% of the contracting farmers receive credit from the processor (Figure 7).

41. In South and Southeast Asia, there has been a sharp increase in contract farming during the past 20 years (Gulati *et al.*, 2007). Typical contract farming commodities are poultry (broilers in particular), dairy and high quality fruit and vegetable production. In Thailand, for example, virtually all commercial produced broilers are produced under contract, whereas the corresponding figure for the Philippines is 80% (Delgado *et al.*, 2003).

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<sup>1</sup> At the end of the 1990s, 31% of the crop production and 56% of the animal production were produced under contracts in the US (Swinnen, 2007).

42. Finally, in Latin-America, vertical coordination is widespread over many different agricultural commodities and includes various contractual arrangements ranging from purely marketing contracts to production contracts with provision of inputs, credit, technical and marketing assistance (Dirven, 1996) (Table 7).

## **5. Implications of transformation for primary producers**

43. Over the past ten years, many case studies and surveys have analyzed the dynamics and effects of the downstream sector on producers and thus sector performance in terms of supply, demand and prices. In this section, we review empirical evidence from case studies and surveys on the impact of the transformation of the agro-food industry in a number of transition and developing countries. Clearly the literature examined does not cover all studies undertaken on this subject. We distinguish between effects on production (efficiency) and effects on welfare (equity).

### *Efficiency effects*

44. The impact of modern supply chains has emerged through various channels, including horizontal (or cross company) and vertical (or household and farm) spill over effects. This increased the availability of such programs for suppliers dealing with these firms (Dries and Swinnen, 2004; Gorton and White, 2007; Dries *et al.*, 2004). Vertical (or household/farm) spillovers produced both direct and indirect effects. The changes in procurement systems, introduction of farm assistance programs which improved farmer access to credit and inputs leading to positive impacts on productivity, quality and investment were the direct effects.

45. The indirect effects were those that reduced production and marketing risks along the chain. For instance, processing firms in modern supply chains reduce production risk by providing their farmers of the necessary inputs, working capital and technical assistance and reduce marketing risks by providing a guaranteed output market, often at guaranteed prices. Reduced production and marketing risks improve stability of a farm income, which is an important benefit for producers operating in high risk environments and in the absence of insurance markets.

46. A number of studies provide evidence that risk reduction is important for farmers engaged in modern supply chains. There is a study on India in which Birthal *et al.* (2005) find that for milk, broilers and fresh fruits and vegetables, farm profits of contract farmers are higher through lower production and marketing costs for contract farms compared with independent smallholders (Table 8). In South Asia, Herath and Weersink (2009) found that the production costs of Indian tea producers significantly decreased after the introduction of modern supply chains. Finally, there are a series of studies that show that guaranteed market access (to output and input markets) and guaranteed prices are the most important motives to engage in contract farming. For example, survey results from the Czech Republic, Slovakia and Hungary, indicate that, at the end of 1990s, the main motivations for farms to contract were guaranteed sales and - although to a lesser extent - guaranteed prices (Table 9).

### *Impact on output and productivity*

47. As noted above, farmers have benefited through effects on output and productivity of the commodity under contract through better access to inputs, timely payments, and investment support. Case studies of the sugar and dairy sector in East Europe show how contracts and farm assistance programs resulted in dramatic increases in output and yield (Gow *et al.* 2000; Dries and Swinnen, 2004). For example, in Slovakia the introduction of contracts caused sugar yields to increase from 32.5 ton/ha with 14% sugar content in 1992 to an estimated 45 t/ha with 16.5% sugar in 1997 (Gow *et al.*, 2000).

48. Similar results were found in a survey of CIS agri-business enterprise executives by White and Gorton (2007) in five CIS countries (Armenia, Georgia, Moldova, Russia and Ukraine). In this study, processors were asked to estimate the impact on agricultural yields and product quality for each of the contract support measures introduced. The mean impact for each contract support measure was an increase of 9.1% in yield. The measures with the greatest impact on yields were specialist storage (especially cooling equipment in the dairy sector), veterinary support and physical inputs (Table 6). Market measures such as prompt payments, guaranteed prices, and market access also had large positive effects.

49. In India, FAO reported on a project in which a company provided contracts to 400 farmers in northern India to grow selected varieties of tomatoes for paste. They found that yields of contracted farmers were 64% higher than those that produce for the spot market (FAO, 2001).

50. In addition to the beneficial effects on output and productivity of the commodity under contract, there are potential spillover effects on other commodities. Receiving farm assistance programs, such as extension services, for one commodity can lead to better management techniques and better input use, even for those not under contract. An example of this is provided by Minten *et al.* (2009) based on a case study of fruit and vegetable production in Madagascar. A fruit and vegetable exporting to five retail chains in the EU contracts with almost 10,000 very small farmers in order to have sufficient supplies. In this case Minten *et al.* (2009) found that in addition to positive welfare effects, there were also significant effects on improved technology adoption, better resource management and spillovers on the productivity of the staple crop rice.

#### *Impact on quality*

51. The emergence of modern supply chains has also led to substantial improvements in the quality of output as processing and retail companies are demanding high quality products. Evidence of these changes in quality can be found in the Eastern European dairy sector (Dries *et al.*, 2009). Figure 8 shows how milk quality rose rapidly following the transformation of the milk supply chain in Poland in the mid 1990s, in Bulgaria, in the late 1990s and in Russia in 2000 and beyond. In Poland, the share of the market held by the highest quality milk producers increased from less than 30% on average in 1996 to around 80% on average in 2001. In Bulgaria, the share of highest quality producers increased from 17% on average in 1997 to 34% in 2003 and the share of the lowest quality milk decreased from 20% in 1997 to 10% in 2003. In the Russian Campina factory, the share of the highest quality milk producers increased from 6% in 2000 to 55% in 2004, while market share of the lowest quality producers fell from 37% to less than 10% over the same period.

#### *Impact on investments and household wealth*

52. The transformation of the supply chain has had a positive effect on farm investments. Loans provided by the processing companies and loan guarantee programs have significantly increased farmer access to credit and facilitated farm investment. In Poland, more than three quarters (76%) of all surveyed dairy farmers made investments in the years after the transformation of the supply chain, including many small farmers with less than 10 cows (Dries and Swinnen, 2004). Several farm assistance programs stimulated investments, including loans provided by the dairy companies to make dairy specific investments. In Poland, dairy farmers used such loans to invest in enlarging and upgrading the livestock herd (30%) and cooling tanks (56%). Other assistance came in the form of bank loan guarantees, and assistance in accessing inputs (mainly feed) by reducing input and transaction costs.

53. Improvement of a farmer's cash flow and access to capital also benefits investments in other farm and non-farm activities, because it reduces financial constraints, particularly in the presence of capital

market imperfections. Other farm assistance programs, such as extension services, can lead to productivity spillovers for other crops for example through better management techniques and input use.

### *Welfare and distributional effects*

While there is a consensus in the literature that the emergence and spread of modern food supply chains is profoundly changing the way food is produced and traded in transition and developing countries. These have had important positive implications for the agricultural production, however, the welfare implications are still under debate. There are four potential welfare concerns with vertical coordination, namely the distribution of rents in the supply chain, the exclusion of smallholders and poor farmers from modern supply chains, gender related issues and health concerns.

#### *Rent distribution in the food supply chain*

54. Due to the introduction of modern supply chains, farmers have better access to credit, inputs and markets due to the introduction of linked contracts while processors have better access to sufficient quantities of high quality products. This implies that productivity and income increases for the supply chain as a whole. However, a key question examined in the literature is: who benefits from this increase in efficiency and total income and more specifically; do farmers receive a fair share of these rents?

55. If the processing firm or retail company can set the terms of the contract such that it captures most or all of the rents, the productivity growth may not benefit farmers; and contracting may even bestow additional monopoly power upon the processing company. In this perspective, contract-farming has often been criticized as being a tool for agro-industrial firms and food multinationals to exploit unequal power relationships with farmers and extract rents from the chain (Warning and Key, 2002). In a study on Kenya, Minot and Ngigi (2004) demonstrated that modern marketing chains put intense pressure on smallholders (although smallholders were still participating). Even more extreme, is the case of the Ivory Coast where almost all of the fruit and vegetables being produced for exports were being cultivated on large industrial estates owned by wealthy industrialist. However, the empirical results from the studies covered in this literature review suggest that farmers often benefit in many ways from contract farming and vertical coordination (e.g. Dries and Swinnen, 2004; BIRTHAL *et al.*, 2005; Gulati *et al.*, 2007; Herath and Weersink, 2009; Minten *et al.*, 2009; Maertens *et al.* 2008).

#### *Participation and exclusion of smallholders*

56. A key concern in the debate on the welfare implications is that the emergence and rapid spread of modern supply chains in transition and developing countries will force a large share of farmers and in particular poor, small farmers out of the market as retailers and food-processing companies prefer to contract with larger and wealthier farmers. This can potentially affect the income distribution within the rural economy and can exacerbate existing patterns of economic stratification (Warning and Key, 2002). Small farmers are most vulnerable because there is an important fixed transaction cost component in exchanges between farms and retailers, making it less desirable for retailers to deal with many small farmers than with a few larger suppliers. New investments are often needed to meet contractual requirements and small farms are constrained financially, either because they do not have sufficient personal resources or because they cannot access external funds in imperfect rural financial markets.

57. However, in many cases food processors have little choice but to work with smaller producers. While in most developed countries production is dominated by larger farm operations, in many developing countries small farms represent the major share of the potential supply base. In such cases, retailers and food processors have successfully integrated these small operations into the supply chain. This is the case,

for example, in the dairy sector in Poland and Romania, and in many other sectors in Eastern European countries (Swinnen, 2005).

58. Case studies from transition countries suggest that company preferences for contracting with large farms are not as obvious as one may think. While processors may prefer to deal with large farms because of lower transaction costs, contract enforcement may be more problematic, and hence costly, with larger farms. Processors repeatedly emphasized that a farmers' "willingness to learn, take on board advise, and professional attitude are more important than size in establishing fruitful farm-processor relationships". In some instances, small farms may have substantive cost advantages. This is particularly the case in labour intensive, high maintenance, production activities with relatively small economies of scale. Finally, processors may prefer a mix of suppliers rather than depend too heavily on a few large suppliers.

59. The empirical evidence on exclusion of poor, small farmers and the welfare effects is mixed. In the early literature, there were several studies that confirmed the prediction that small and poor farmers are systematically excluded from the supply chain, which negatively affected their incomes (Farina and Reardon, 2000). For example, several studies in Latin America and Africa argued that small farmers were being left behind in the supermarket-driven horticultural marketing and trade (Dolan and Humphrey, 2001; Humphrey *et al.*, 2004; Key and Runsten, 1999; Reardon *et al.*, 2003a; Weatherspoon *et al.*, 2001). Likewise, Weatherspoon and Reardon (2003) reported that the rise of supermarkets in Southern Africa failed to help small producers who were almost completely excluded from dynamic urban markets due to quality and safety standards.

60. In contrast, some recent research suggests a more nuanced picture of the effect of vertical coordination on small farm exclusion. Many surveys in Eastern Europe and the CIS found little evidence that small farmers have been excluded from supply chains (Dries and Swinnen, 2004; Dries *et al.*, 2009). In the CIS, the vast majority of companies have the same or smaller suppliers in 2003 than in 1997 (Swinnen, 2005). Minten *et al.* (2009) and Maertens and Swinnen (2009a) found that poor rural households experienced measurable gains from supplying high quality horticulture commodities to global retail chains in Madagascar and Senegal. In addition, Maertens and Swinnen (2009a) and Maertens *et al.* (2008) show that much of the welfare benefits for the poor can come through their participation in the labour market, which is ignored by most other studies. They found that in Senegal exports of fruits and vegetables were mainly based on contracts with farming households initially. However due to increasingly stringent food standards, vertical coordination changed towards fully integrated production on agro-industrial holdings. This has decreased contract farming and increased employment on agro-industrial farms. The study suggests that contract farming was highly beneficial for households, but more so for those households with more land, livestock and other assets. Agro-industry employment in Senegal did not appear biased with the poorest households participating. The income effects of this employment were significant although less than those from contract farming (Figure 9).

61. In China, Wang *et al.* 2009 found that despite the emergence of supermarkets in urban areas, there has been almost no penetration of modern supply chains into farm communities. In the area around Beijing, less than 6% of the purchases of horticultural products from farmers were by partners involved in modern supply chains - either supermarkets, professional suppliers or processing firms. In Shandong, where they studied producers of tomatoes and cucumbers, the share is even smaller (around 1%). Similar findings are reported by Huang *et al.* 2008, who found that almost all producers in Shandong were selling their apples and grapes into traditional marketing channels and not through modern supply chains.

62. One can conclude that, in general, companies tend to source from larger farmers, although there are exceptions to this pattern where small farmers dominate the agrarian structure. For example in the Czech Republic and Slovakia, where fruit and vegetable suppliers are mostly large farms, the retail sector preferred to contract with them because they were better able to deliver good quality and to finance

investments themselves. But, where firms source from larger farms, it is crucial to integrate the labor market effects in the welfare analysis. The few studies that did incorporate employment effects, show important welfare gains in rural households from wage employment on these farms. More analysis based on case studies in diverse developing countries is needed, to ensure such findings are robust.

63. When companies source a product, they search for suppliers with the requisite non-land assets such as irrigation, management skills, farm equipment, and access to paved roads. Small farmers often lack credit, inputs, or skills, and therefore companies often introduce vertically coordinated farm assistance programs to address those constraints and to integrate these farmers in the supply chain. For example, in Croatia and Serbia, where fruit and vegetable suppliers are mostly small farms, supermarkets have introduced input assistance and supplier investment support (Reardon *et al.*, 2003b; Dries *et al.*, 2004).

#### *Gender issues*

64. An issue which has received little attention so far in the discussion on modern supply chains and welfare is gender; and the few studies that exist give mixed results. There is a body of literature that claims modern supply chains entail detrimental gender effects. Dolan (2001) points to the fact that female farmers are disadvantaged in contract farming schemes in the Kenyan export horticulture sector and Barrientos *et al.* (2001, 2003) indicate that female farm workers are exploited in the South African deciduous fruit sector.

65. However, these studies do not take in account the labour market effects that can occur in the presence of modern supply chains. Maertens and Swinnen (2009b) report, based a study of the supply chain for fresh fruit and vegetables in Senegal, that the emergence and spread of modern supply chains across developing countries is associated with direct beneficial effects for rural women and reduced gender inequalities in rural areas. They found that women benefit to a greater extent and more directly from large-scale estate production and agro-industrial processing, and from the creation of employment in these modern agro-industries than from high-value smallholder contract farming.

#### *Farmers' health*

66. In the 1980s and 1990s, the increase in export intensity of fresh fruit and vegetables and the export markets' demand for aesthetic attributes such as color, shape and spotlessness has encouraged farmers in transition and developing countries to rely increasingly on heavy amounts of pesticides (Ohayo-Mitoko, 1997; Thrupp *et al.*, 1995). This heavy reliance on pesticides has been accompanied by increased incidence of pesticide related acute and chronic illnesses.

67. However, the recent introduction of high food standards in modern supply chains has led to a reduction in the use of pesticides and consequently also a substantial improvement of farmers' health. For example, in Kenya, Asfaw *et al.* (2009) found that the adoption of GlobalGAP standards has a positive and significant impact on farmers' health both in terms of reduction of pesticides related to acute poisonings and its associated cost of illness. Farmers who adopt GlobalGAP standards experienced 70% less incidences of acute illness and spent about 50-60% less on restoring health compared with non-adopters (Asfaw *et al.*, 2009).

## **6. Concluding observations**

68. Global food production and distributions systems have undergone fundamental changes in recent decades, particularly in transition and developing countries. Firms and farms have been privatized, markets liberalized, and food supply chains integrated into the global economy. Over the past ten years the impact of modern supply chains on primary producers has been profound in the transition and developing



countries. This has been the outcome of responses to changing consumer demands regarding food quality and safety and to structural changes in the food supply chain with increased contracting and vertical coordination.

69. From the set of studies reviewed in this report there is a consensus that modern food supply chains have important positive implications for production. Two major issues remain in need of further analysis to draw conclusions about the welfare implications of this transformations: 1- the degree to which small farms and farm workers are included/excluded in this transformation process and 2-the extent to which inclusion may have raised incomes and/or modernized farming practices.

70. The existing studies indicate mixed results. Some studies find that small, poor farmers have been systematically excluded from the modern supply chains, negatively affecting their incomes. Other studies suggest a more positive impact with little evidence of exclusion and positive welfare effects for farmers participating in contracting and vertical coordination schemes.

71. Findings on the welfare and income impacts of modern supply chains must be nuanced. Small producers often lack the necessary resources or human skills to adapt to new requirements but processing and distribution companies often introduce vertically coordinated farm assistance programs to address these constraints and integrate these producers in the supply chain. In some cases, smaller farms participating in modern supply chains were found to have achieved substantial positive welfare gains not only in the form of higher incomes through increased productivity and output; but also through the opportunity to invest in new technologies and innovations to upgrade the quality of their products to comply with the higher food standards of modern supply chains. In addition, some studies suggest that participation in modern supply chains may have reduced gender inequalities in rural areas as well as the use of pesticides, thereby improving farmers' health and the local environment. When companies source from larger farmers, it is important to account for labor market effects in the analysis. The few studies that did so indicate important welfare gains in rural households from wage employment on these farms, thus more work in this area is needed.

72. In this perspective, the emergence and rapid growth of modern supply chains offers opportunities to contribute to sustainable economic, societal and environmental development of rural areas in transition and developing countries. Private investments in the agro-food industry and the development of modern supply chains can lead to substantial innovation, including the transfer of new technologies. This provides at least partial responses to three issues. First, innovation in the supply chain of transition and developing countries is needed to substantially increase productivity, which is necessary to respond to the growing demand for feed, food and non-food uses of agricultural raw materials. Second, in response to growing demand for high food standards, the adoption of alternative, more environmentally friendly production practices makes sure that productivity increases occur in an environmentally sustainable way. Finally, innovation can contribute to economic growth and play an important role in poverty alleviation.

73. Governments have an important role in generating an overall enabling environment for the development of a modern competitive agro-food system. Attracting capital to invest in market based solutions and specific firm strategies requires that governments provide infrastructures,- institutional and physical-, that permit firms to operate efficiently. The essentials elements to this environment are property rights, infrastructures and trade policy compatible with economic growth and development. While recognising the need for more research into these matters, the studies reviewed here suggest a number of ways in which governments can facilitate equity and efficiency gains in modern supply chains.

- *Reduce the transaction costs:* The main disadvantage of contracting with small farmers is the increase in transaction costs for the processing or retail companies. Governments can help to reduce these costs by improving rural infrastructure to improve market access for remote areas,

ensure reliable electricity supplies and provide adequate cooling and storage facilities. Investment in intermediary institutions, such as farmer associations and produce collection points, may also reduce transaction costs between farm and input supplier/processor. In addition, farmer associations can enhance producer bargaining power *vis-à-vis* suppliers and processors.

- Enhance competition: Competition tends to induce processors, retailers, and input suppliers to provide more supplier assistance programs and to constrain rent capture by either up- or downstream companies. Competition in food supply chains can be maintained by ensuring domestic competition policies are diligently applied to the sector while pursuing regulatory reforms and liberal trade policies that lower barriers to entry.
- Enhance bargaining power of (small) farmers: Governments can offer a number of different means of support to smaller operators such as measures to increase the transparency of contracts, provide for dispute settlement arrangements, provide market benchmarks for price negotiations, training in contract rights/obligations and establishing production quality control centers.

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## TABLES

Table 1. Waves of retail transformation in Eastern Europe

Indicators	Year	First Wave				Second Wave			Third Wave	
		CZ	HU	PL	SK	CR	RO	BU	RU	UK
Retail Development										
% modern retail in total	1998	54	46	27	34	19	3	5	-	-
	2002	55	48	44	49	42	8	23	1-2	<1
Foreign food retail sales per urban resident (USD)	2002	808	503	302	377	93	64	148	4	2
% income spent in foreign food retailers	2002	14	10	7	8	2	3	8	0.2	0.3
Reform & Development										
Reform progress EBRD	1998	3.5	3.7	3.5	3.3	3.0	2.7	2.8	2.5	2.5
	2002	3.4	3.7	3.5	3.3	3.5	3.1	3.3	2.9	2.7
EU membership		2004	2004	2004	2004	-	2007	2007	-	-
GDP/capita (USD)	1998	5500	4600	4100	4000	4800	1900	1550	1800	800
	2002	6700	6600	4900	4400	5000	2100	2000	2400	850
Income category		Upper middle	Upper middle	Upper middle	Upper middle	Upper middle	Lower middle	Lower middle	Lower middle	Lower middle
Demography										
% urban population	2002	75	65	63	58	59	56	68	73	68
% females in workforce	2002	64	52	60	63	60	62	71	64	62
Male/female labor force	2002	1.2	1.3	1.2	1.2	1.2	1.2	1.1	1.2	1.2

Source: Dries *et al.* (2004)

**Table 2. Development of supermarkets in China (1994-2002)**

Year	Stores		Sales		Share in total national retail (%)
	Number	Annual Increase (%)	USD bn	Annual increase (%)	
1994	2500	-	0.38	-	0.18
1995	6000	140.0	0.96	167	0.38
1996	10000	66.7	3.61	275	1.21
1997	15000	50.0	5.06	40	1.54
1998	21000	40.0	12.05	138	3.43
1999	26000	23.8	18.07	50	4.82
2000	32000	23.1	26.51	47	6.50
2001	40500	26.6	37.11	40	8.20
2002	53100	31.1	55.13	49	11.20

Source: Hu *et al.* 2004

Table 3. Growth in modern retail sales by region (%)

	South America	Central America	Mexico	Southeast Asia	South Asia	East Asia Transition	Europe CIS	Central Europe & Baltics	Southeast Europe	Sub-Saharan Africa	South Africa	North Africa	Middle East
2002	-37	4	-8	21	32	50	56	17	62	7	-18	19	7
2003	-9	15	-7	19	49	36	54	25	43	11	51	30	24
2004	8	-5	2	8	40	19	47	16	39	-3	22	19	17
2005	18	-1	8	9	57	19	30	9	15	3	3	12	10
Average	-5	3	-1	14	44	31	47	17	40	4	14	20	15
Real GDP Growth Rate	3	3	2	5	7	9	7	4	5	4	4	5	4

Region	Countries
South America	Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay and Venezuela
Central America	El Salvador, Guatemala, Honduras and the Dominican Republic
Southeast Asia	Indonesia, Malaysia, Philippines and Thailand
South Asia	India and Pakistan
East Asia Transition	China and Vietnam
Europe CIS	Moldova, Russia and Ukraine
Central Europe & Baltics	Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland and Slovakia
Southeast Europe	Bosnia and Herzegovina, Bulgaria, Croatia, Romania and Serbia
Sub-Saharan Africa	Côte d'Ivoire, Ghana, Kenya and Tanzania
North Africa	Algeria, Morocco and Tunisia
Middle East	Egypt and Lebanon

Source: Reardon and Berdegue (2006).

**Table 4. The changing structure of world agricultural trade, 1980-2000**  
(% of total exports)

Product classification	World Exports		Developing country exports		Industrial country exports	
	1980/81	2000/01	1980/81	2000/01	1980/81	2000/01
<b>Tropical products</b>						
Coffee, cocoa, and tea	8.5	5.4	18.3	8.5	2.5	3.6
Nuts and spices	1.3	1.5	2.4	2.8	0.7	0.8
Textile fibres	5.9	2.8	8.0	3.3	4.5	2.6
Sugar, confectionary	6.4	3.1	10.5	4.3	3.9	2.3
<b>Subtotal</b>	<b>22.0</b>	<b>12.7</b>	<b>39.2</b>	<b>18.9</b>	<b>11.6</b>	<b>9.3</b>
<b>Temperate products</b>						
Meat	11.9	12.0	7.2	6.0	14.8	15.4
Milk products	5.0	5.2	0.3	1.1	7.9	7.6
Grains	16.9	9.9	9.3	7.0	21.6	11.6
Animal feed	7.7	6.4	7.5	8.5	7.7	5.3
Oil and oil seeds	4.7	4.8	4.6	5.5	4.8	4.4
<b>Subtotal</b>	<b>46.3</b>	<b>38.3</b>	<b>28.8</b>	<b>28.1</b>	<b>56.9</b>	<b>44.2</b>
<b>Seafood, fruits, and vegetables</b>						
Fish and seafood	6.0	12.2	6.9	19.4	5.5	8.0
Fruits and vegetables	13.7	18.9	14.7	21.5	13.1	17.3
<b>Subtotal</b>	<b>19.8</b>	<b>31.0</b>	<b>21.6</b>	<b>41.0</b>	<b>18.7</b>	<b>25.4</b>
<b>Other processed products</b>						
Tobacco, cigarettes	2.8	4.2	2.6	3.3	3.0	4.8
Beverages	4.7	8.6	1.1	3.6	6.9	11.5
Other products	4.4	5.1	6.7	5.2	3.0	5.0
<b>Subtotal</b>	<b>11.9</b>	<b>17.9</b>	<b>10.4</b>	<b>12.1</b>	<b>12.8</b>	<b>21.2</b>
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Source: Aksoy (2005).

Table 5. Farm assistance programs offered by dairy companies in Central Europe

Company Name	Credit – specific	Credit - general	Input supply	Extension service	Veterinary service	Bank loan guarantee
<b>POLAND**</b>						
Mlekpól	Y		Y	Y	N	Y
Mleczarnia	N		Y	N	N	Y
Kurpie	Y		Y	Y	N	Y
Mazowsze	Y		Y	Y	N	N
ICC Paslek	Y		Y	Y	N	Y
Warmia Dairy	Y		Y	Y	Y	Y
<b>BULGARIA</b>						
Merone	Y(2000)	N	Y(????)	Y(1992)	N	N
Fama	Y(1994)	N	Y(1994)	N	N	Y(once)
Mlekimex	Y(1997)	Y(1998)	Y(1997)	Y(1999)	Y(1997)	Y(1998)
Danone	Y(1997)	N	Y(1998)	Y(2000)	Y(1995)	Y(1999)
Iotovi	N	N	Y(1995)	N	N	Y(1995)
Milky World	Y(1999)	Y(2000)	Y(1999)	Y(1999)	N	Y(1999)
Markelli	Y(1999)	N	Y(1998)	N	N	N
Mandra						
Obnova	Y(1998)	N	Y(2000)	Y(2000)	N	N
Meggle	Y(2001)	N	Y(2001)	Y(2001)	N	N
PRL	N	N	N	Y(2002)	N	N
Serdika 90	Y(1997)	N	Y(1997)	Y(1997)	N	N
<b>SLOVAKIA</b>						
Liptovska	Y(2000)	N	N	Y(1994)	N	N
Mliekospol	Y(1999)	N	N	Y(1992)	Y(1992)	Y(1992)
Rajo	Y(2001)	N	Y/N	Y(1992)	N	N
Levicka	Y(1998)	N	Y(1998)	Y(2000)	N	Y(1998)
Tatranska	Y(2001)	N	Y(2000)	Y(2000)	N	N
Nutricia Dairy	Y(2000)	N	N	N	N	Y(2000)
<b>ROMANIA</b>						
Danone	Y		Y	Y		Y
Friesland	Y		Y	Y		Y
Promilch	Y		Y	Y		Y
Raraul	N		Y	Y		N

\* Either the company provides inputs and the farmer pays back later, or the company offers forward credit, which the farmer uses to buy inputs.

\*\* In Poland no distinction is made between credit for dairy-specific investments and general investments. Farm-level evidence shows that the dairy companies mainly support dairy-specific investments

Source: Swinnen (2005).

**Table 6. Distribution and Impact of Contract Support Measures in 5 CIS countries (Armenia, Georgia, Moldova, Russia and Ukraine)**

<b>Measure</b>	<b>% of sample offering particular support measure</b>	<b>Ave. % change in farm yields due to measure</b>	<b>Ave. % change in farm output reaching high standards due to measure</b>
Prompt payments	46.7	11.4	12.0
Transportation	45.0	6.8	5.7
Credit	38.8	9.3	8.8
Physical inputs	33.3	12.4	14.2
Quality control	31.7	7.6	17.2
Guaranteed prices	23.3	11.1	8.9
Agronomic Support	21.7	6.5	5.0
Farm loan guarantees	18.3	6.8	6.0
Machinery	16.7	5.0	4.0
Specialist storage	15.0	10.0	8.3
Harvest / handling	11.8	9.3	5.4
Business / financial management	10.0	6.2	4.2
Market access	10.0	11.2	14.2
Veterinary support	8.3	17.0	17.0
Investment loans	6.7	5.5	5.0
<b>Average</b>		<b>9.1</b>	<b>9.5</b>

Source: White and Gorton (2007).

Table 7. Vertical coordination in Latin-American agri-food chains

Product	Destination	Contracting					Vertical Integration
		Marketing	Technical assistance	Credit	Inputs	Management	
<b>Tomato(paste)</b>							
Nicaragua	Domestic	X					
Paraguay	Domestic						
Ecuador	Domestic						X
Mexico	Domestic	X					X
Peru	Domestic						X
<b>Fruit &amp;Vegetables</b>							
Guyana	Domestic	X					
Ecuador	Domestic	X					
Trinidad & T	Domestic	X					
Mexico	Export	X	X	X	X	X	X
Guatemala	Export	X	X	X	X	X	X
El Salvador	Export	X	X	X	X		
Peru	Export	X					X
<b>Chicken</b>							
Trinidad & T	Domestic	X	X	X	X		X
Jamaica	Domestic	X		X			
<b>Tobacco</b>							
Chile	na	X	X	X	X		
Guatemala	na	X	X	X	X		
<b>Sugarcane</b>							
Nicaragua	Exp&Dom	X	X		X		X
Guatemala	Exp&Dom						X
<b>Sesame Seed</b>							
Nicaragua	Export	X		X			
Guatemala	Export	X					
El Salvador	Export						
<b>Malt. barley</b>							
Chile	Domestic	X	X		X		
Peru	Domestic	X		X	X		
<b>Rice</b>							
Trinidad & T	Domestic	X	X		X		
Paraguay	na	X		X			
Dominican R	na	X					
<b>Dairy</b>							
Trinidad & T	Domestic	X	X	X			
Jamaica	Domestic	X					
Ecuador	Domestic	X					

Source: Dirven (1996).

**Table 8. Production and transaction cost of milk, broiler and vegetable production in contract and non-contract farming in India (Rs/ton)**

Commodity	Contract farming			Non-contract farming		
	Production cost	Transaction cost	Total cost	Production cost	Transaction cost	Total cost
Milk	5,586	100	5,686	5,728	1,442	7,170
Broiler*	808	38	846	27,322	90	27,412
Vegetable**	1,485	35	1,520	1,630	437	2,067

Note: For broiler, the firm provides free chicks, feed and medicines to the contract farmers. Vegetable costs refer to spinach.

Source: BIRTHAL *et al.* (2005).

**Table 9. Contract Motivations for farms in Central Europe**

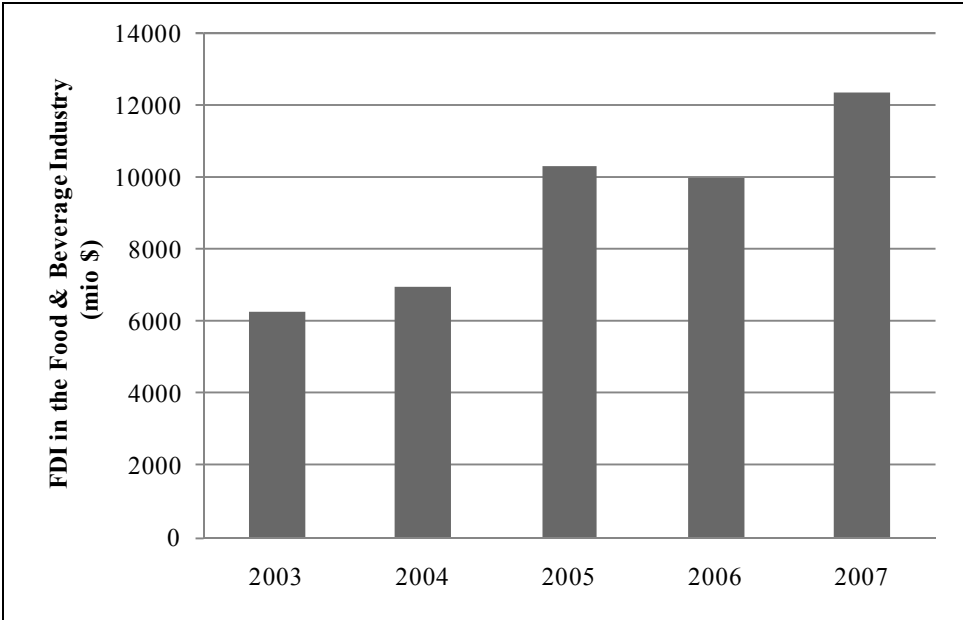
Most Important Reason for Contracting (%)	Czech 1999	Slovak 1999	Hungary 1997
Higher prices	9	8	10
Stable prices	7	22	33
Guaranteed sales	64	50	43
Pre-payment	7	13	3
Access to credit	0	0	9
Access to inputs and assistance	7	6	2
Other	6	2	0

Source: Swinnen (2005).



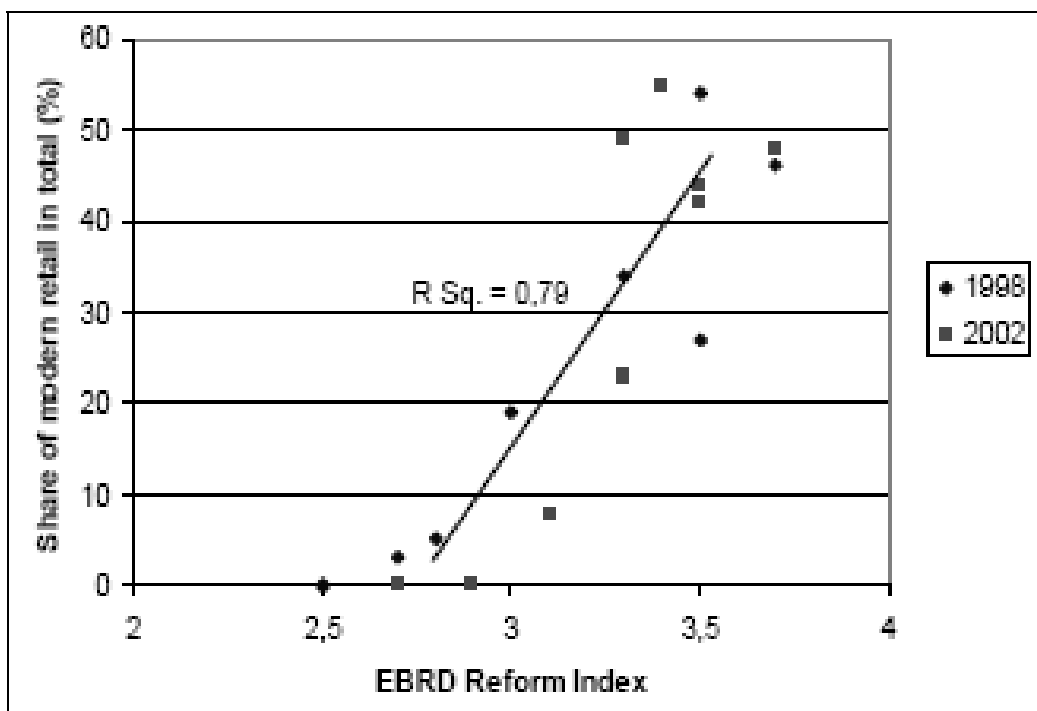
**FIGURES**

**Figure 1. FDI in the Food & Beverage Industry in Eastern Europe**



Source: World Investment Reports (Various years)

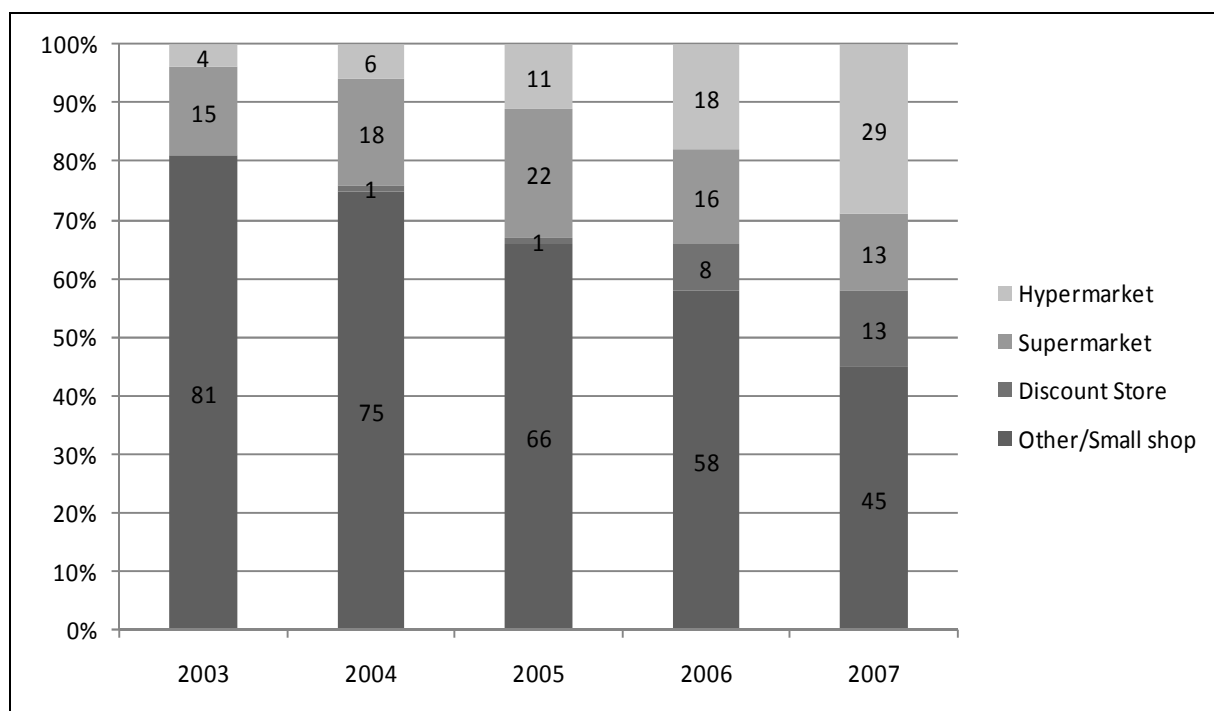
Figure 2. Share of the Modern Retail Sector in Total and Reform Progress



\* 1998 and 2002 data for Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Russia, Slovakia, Ukraine.

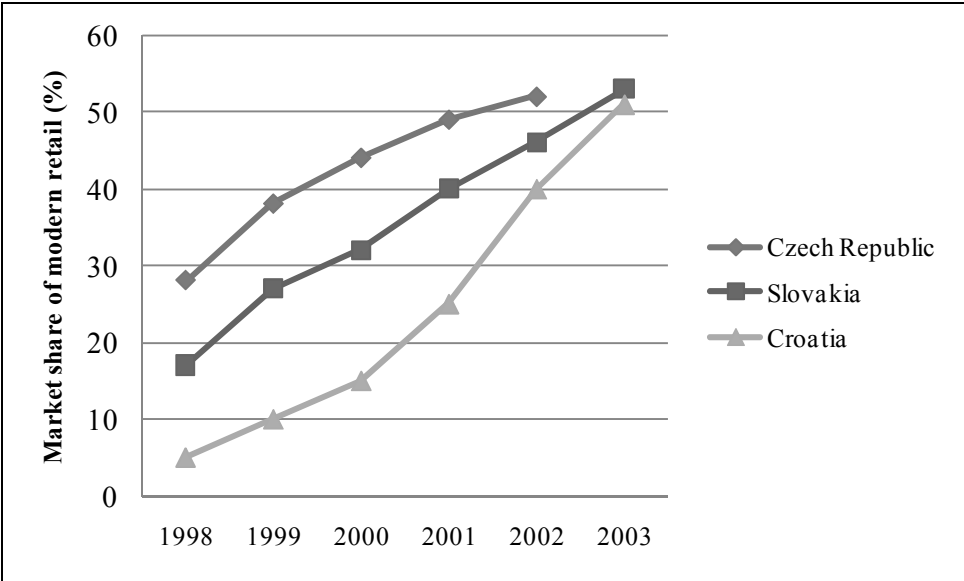
Source: Dries et al. (2004)

Figure 3. The Main Shopping Place for Food in 2008 in Romania



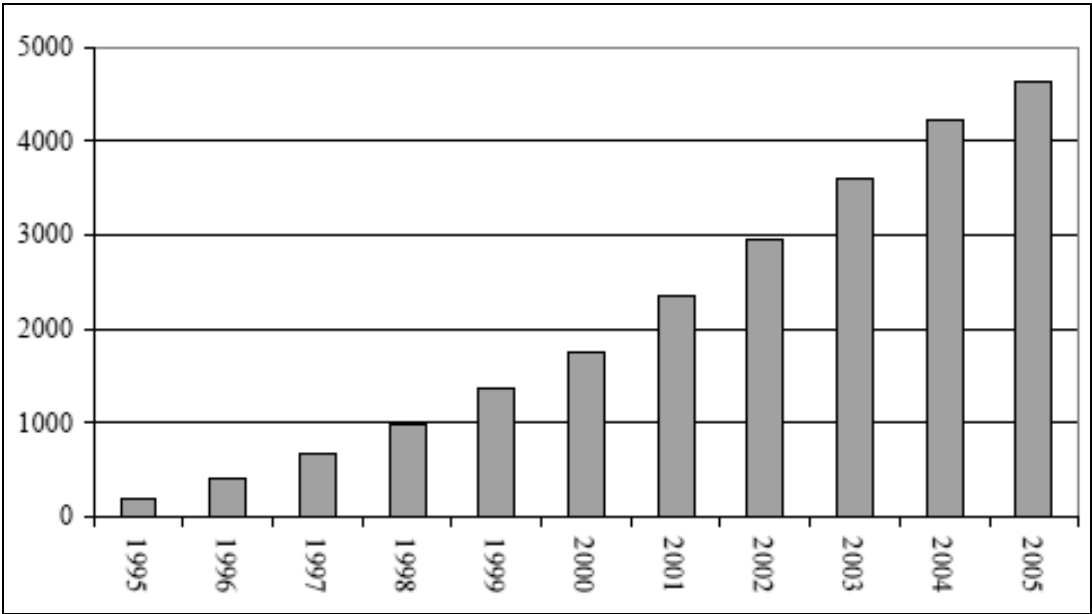
Source: Shopping Monitor Central & Eastern Europe 2009 (survey by Incoma GfK).

Figure 4. The Spread of the Modern Retail Sector\*



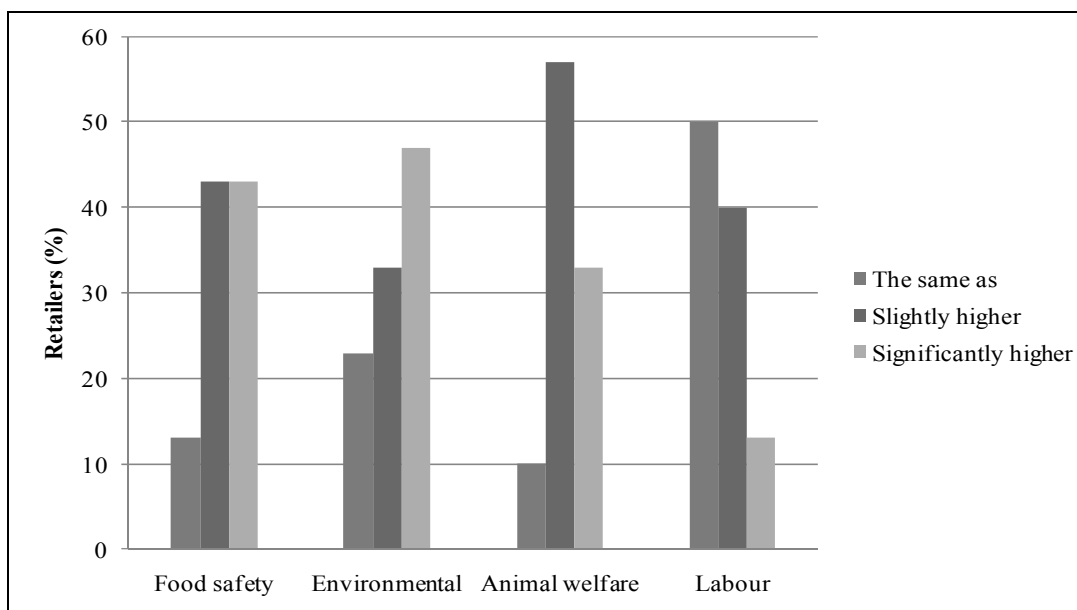
\* The modern retail sector comprises hypermarkets, supermarkets, and discount stores  
Source: Dries et al. (2004)

Figure 5. Notification of new SPS measures to the WTO, 1995 to 2005



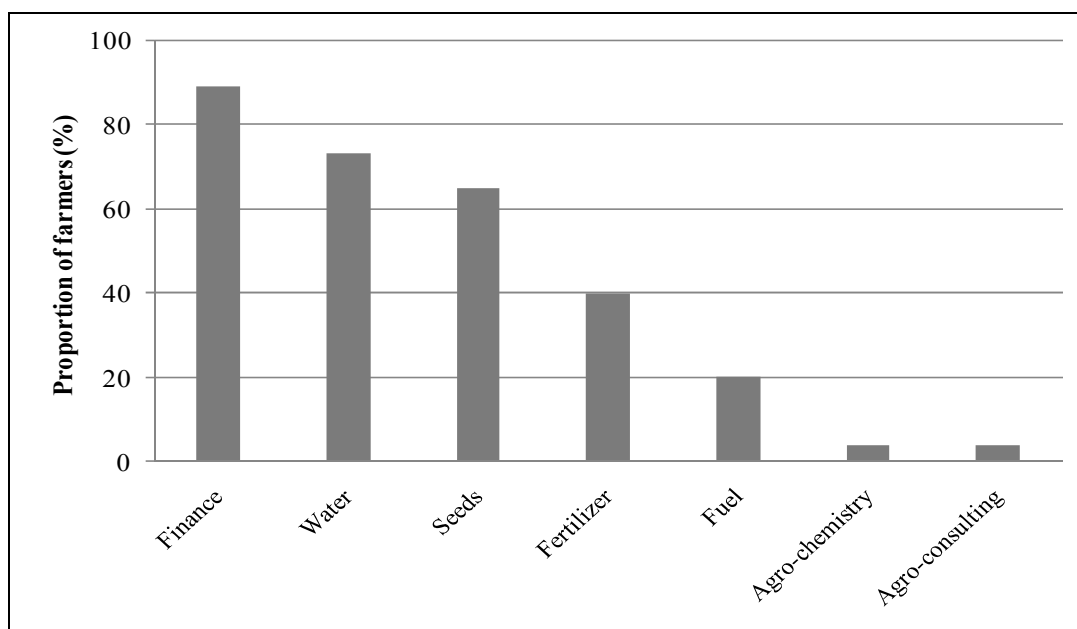
Source: Henson (2006)

**Figure 6. Retailers' Self Assessed Standards compared to those of the Government**



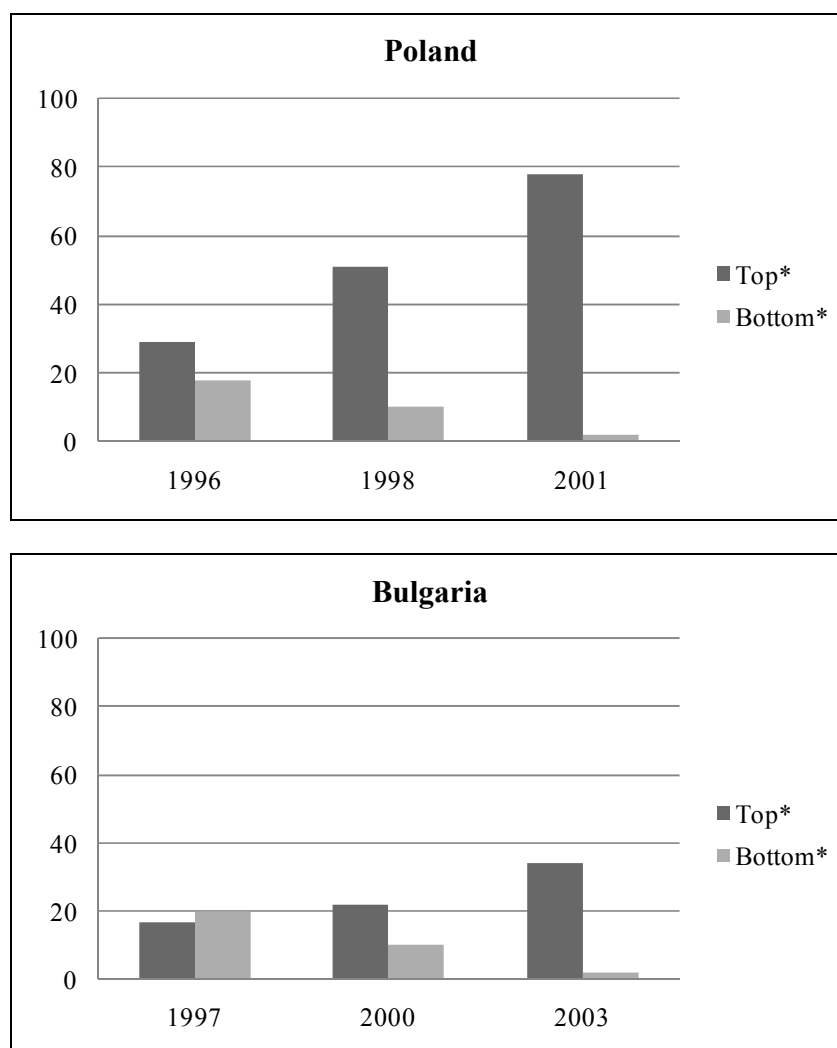
Source: Fulponi (2007).

**Figure 7. Proportion of farmers receiving specific aspects of farming assistance from cotton gins in Kazakhstan in 2003**



Source: Swinnen *et al.* (2007).

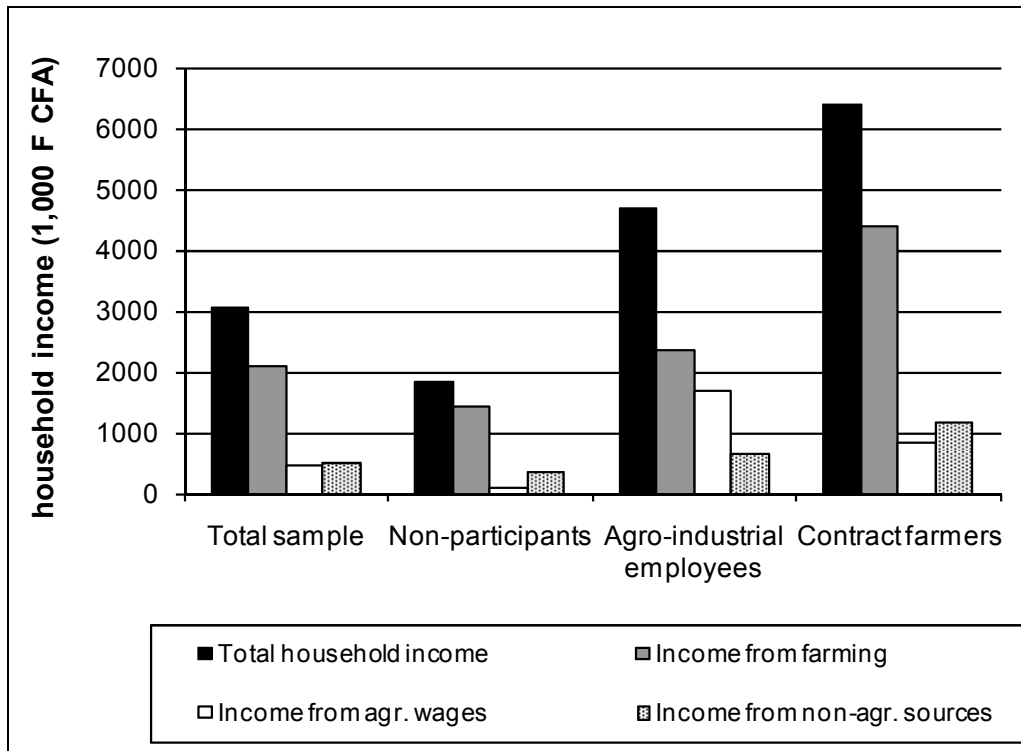
Figure 8. Change in Milk Quality in Eastern Europe



\*Average share in total milk supply; \*\*milk deliveries to the Campina factory in Stupino

Source: Dries *et al.* (2009)

Figure 9. Income effects of bean exports in Senegal



Source: Maertens and Swinnen (2009a)