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Agrifood Industry Transformation & Small Farmers in Developing Countries

THOMAS REARDON

Michigan State University, East Lansing, Michigan, USA

CHRISTOPHER B. BARRETT

Cornell University, Ithaca, New York, USA

JULIO A. BERDEGUÉ

Rimisp- Center for Latin American Rural Development, Santiago, Chile

JOHAN F.M. SWINNEN

Katholieke Universiteit Leuven, Leuven, Belgium

Summary. — This introductory article presented the objectives and issues of the special issue, reviewed existing literature on developing country trends in agrifood industry transformation (restructuring of the sectors and procurement system modernization by companies in the restructured sectors) and its impacts on farmers, and previewed the key points of the articles in the special issue and noted their contributions to the literature.

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1. INTRODUCTION

The transformation of the agrifood industry, which includes processing, wholesale, and retail, has taken place in two stages over the past 50 years in developing countries. The first stage, “pre-

liberalization/pre-globalization,” took place mainly in the 1950’s-early 1980s. It involved public-sector governed food system transformation. This was a period of government investment in the “modernization” of the segments, to shift from traditional small-scale informal agrifood industry, to formal sector, larger-scale forms; examples include government investment in municipal wholesale markets, parastatal processing firms, and state-run retail chains.

The second stage, “liberalization/globalization,” started in the early 1980s and continues today. This stage has seen food trade double, induced by trade liberalization and improvements in logistics. But Reardon and Timmer (2007) argue that agrifood industry structural transformation within developing countries dwarfs the change in trade. Liberalization of food processing and retail FDI spurred massive FDI and competitive domestic investments. While governments continued to build wholesale markets, the main new developments were private sector investment in and consolidation of processing and retail. The latter spurred a “supermarket revolution” and the spread of fast-food chains. The structural transformation occurred at speeds never before observed. The transformation has been characterized by consolidation, multinationalization, specialization/differentiation, and organizational and institutional change via the rise of vertical coordination (via contracts and market linkage arrangements) and private grades and standards (Reardon et al. 1999, Reardon and Barrett, 2000, Reardon and Timmer, 2007, Swinnen 2007). The transformation was induced by socioeconomic factors such as income increases and urbanization, and policy changes such as market liberalization and privatization, and by the liberalization of food industry foreign direct investment (FDI), usually anticipated or followed by competitive domestic investment. The empirical research documenting the emergence of that transformation caused surprise and shock waves in development research and practitioner circles, and spurred a body of literature over the past

decade documenting agrifood industry restructuring and organizational and institutional change (reviewed in section 2).

However, by comparison, much less survey-based research has been done on the impacts of that transformation on farmers and farm workers. That gap is particularly important because there is developing substantial controversy around two issues: to what extent and under what conditions: (1) does the transformation “include” or “exclude” small farmers and farm workers? (2) does inclusion raise incomes and modernize technologies of farmers? A hypothesis underlying the debate is that the transformation is expected to be potentially excluding of small and/or asset-poor farmers without the capacity to respond to requirements of quality, consistency, volume, and transaction specifications demanded by the modern food industry. This special issue aims squarely at the above gap in knowledge and seeks to inform the debate on those two issues.

This introductory article proceeds as follows. In section 2, we review recent research on agrifood industry transformation and its impacts on farmers and farm workers, in order to place in context the contributions of the papers in the special issue. In section 3, we summarize the key points of the papers in the special issue. In section 4, we conclude with policy implications.

2. REVIEW OF LITERATURE AS BACKGROUND TO THE SPECIAL ISSUE

There are three strands of recent literature of most relevance as context for the special issue: (1) transformation of the agrifood industry’s structure (in particular, restructuring via consolidation and multinationalization); (2) transformation of the restructured industry’s systems of procurement of products from suppliers (including wholesalers, processors, and farmers); and

(3) patterns, determinants, and effects of farmers' participation in transformed agrifood industry market channels. We review each strand in turn.

(a) Strand: Agrifood industry restructuring

Above we noted that there have been two “broad stages” over the past 50 years: “pre-liberalization/pre-globalization” (mainly 1960s- mid 1980s) and “liberalization/globalization” (mainly mid 1980s to now). Super-imposed on those two stages are three “broad phases” of agrifood industry transformation, with the timing dependent on the region: (1) transformation of wholesaling, mainly in the 1960s-early 1990s; (2) then of processing, mainly in the 1970s-1990s; (3) and then of retailing, mainly in the 1990s-2000s.

The restructuring of each industry segment was driven by three similar sets of determinants (set out for retail restructuring by Reardon et al., 2003, but applicable to all three segments): (1) policy interventions such as public investments, market liberalization, and FDI liberalization; (2) demand side factors such as urbanization, rising incomes, and reduction in consumers' transaction costs due to more refrigerators, roads, and vehicles; (3) FDI and competitive domestic investments fueled by agrifood industry entrepreneurs seeking economies of scale, scope, and specialization.

Below we treat briefly the three sub-strands of the “restructuring” literature strand, using the above schema of three broad phases (matching the transformation of the three segments).

(i) Restructuring of the wholesale sector

There have been three sets of this literature. First, in the 1970s/1980s, there was a substantial literature on the “initial public investment phase”, showing the rapid spread of public wholesale

markets, mainly in Latin America and Asia outside China. The trend occurred in China mainly in the 1990s (see Ahmadi-Esfahani and Locke 1998, and Huang et al. 2007). This literature on the initial public investment phase (such as Abbott, 1967) emphasized the need for public investment in diffusion and upgrading of wholesale markets, and concomitant investment in market information systems, 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.

Second, beyond the initial public investment phase, in the 1990s/2000s the debate turned to upgrading to reduce transaction costs and deregulation of wholesale markets 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. (2007b) for Mexico. Some literature analyzed the impacts of wholesale market deregulation/liberalization, showing mixed results. Farmers were shown to earn higher net gains (for China grain markets, see de Brauw et al., 2000), but also face greater market risk from a higher variance in prices (for Madagascar grain markets, see Barrett and Dorosh, 1996).

Third, in the 2000s, a new literature is emerging on restructuring of the wholesale sector, pointing to the following: (1) nascent consolidation, both in rural wholesale (for vegetables in West Java, Indonesia, see Natawidjaja et al. 2007), within urban wholesale markets (for fruit in Mexico, see Reardon et al. 2007b), and over wholesale markets (for vegetables in China, see Huang et al. 2007); (2) multinationalization of wholesale and logistics, moving into new countries or provinces as “follow sourcing” for their modern retail clients (Reardon et al. 2007a); (3) the emergence of “specialized and dedicated wholesalers” - specialized in a product category like produce, dedicated “downstream” to modern food industry clients, and charged by those

clients to source “upstream” from farmers and processors, using mechanisms of vertical coordination to ensure the supply meets the requirements of the food industry clients (Reardon and Berdegue, 2002); these modern wholesalers are often larger and more capitalized than the traditional broker (for Indonesia, see Natawidjaja et al. 2007).

(ii) Restructuring of the processing sector

There have been three sets of this literature, each capturing part of a graph of a “U-curve”, with industry concentration on the vertical axis and time on the horizontal axis. The first part of the U is the period of relative concentration in processing – with public sector domination of the formal sector. The second part of the U is a period of relative de-concentration, after liberalization and privatization. The third part is a period of re-concentration, this time dominated by large private sector players including multinationals. We retake these below.

First, in the 1970s/1980s, there was a substantial and well-known literature documenting the emergence of parastatal large-scale processors. This was of course standard in the socialist countries, but was also common in grain and meat and export crop sectors in most developing countries.

Second, in the 1980s and especially the 1990s, there was a literature on processing sector liberalization and privatization, followed by rapid product differentiation and proliferation of private small and medium sized processing companies. Examples include Rubey (1995) and Farina (1997) for grain flour sectors in Zimbabwe and Brazil. That proliferation was encouraged by a massive increase in the consumption of processed foods spurred by rising incomes, urbanization, and concomitant increase in the opportunity cost of women’s time in the 1990s, for example in Asia (Pingali 2006).

Third, in the second half of the 1990s and 2000s, a new and substantial literature emerged on restructuring of the domestic processing sector (Wilkinson, 2004), showing: (1) rapid consolidation, with many mergers and acquisitions of the hitherto proliferating small and medium companies; (2) multinationalization under 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, and Gutman 2002), and the general food processing sector in India (Bhavani et al. 2006) and Latin America (Schejtman, 1998).

(iii) Restructuring of the retail sector

There have been two sets of literature, before and after the “take-off” of retail transformation in the early 1990s, which included the “supermarket revolution” and also the rapid spread of fast-food chains in developing countries.

First, in the 1970s/1980s, there was a literature that in many instances combined analysis of public retail food distribution and consumer subsidy schemes with state-run food retail chains or outlets, such as the Fair Price Shops in India (e.g., Jha, 1992). Some national governments also invested in state-run retail chains, such as in China, Russia, Mexico, and Zambia. Many municipal governments invested in public “wetmarkets” (produce retail markets with many small stalls). There was a tiny niche (mainly in large cities, serving upper-income consumers) of private-sector supermarket chains; a limited literature followed these, and made strong predictions that there could never be substantial diffusion of supermarkets in developing countries (Goldman 1974).

Second, sharply contrary to predictions, there was a massive “take-off” of the diffusion of supermarkets starting in the early-mid 1990s, and an incipient emergence of fast-food chains in the mid 1990s and early 2000s. This “take-off” was driven by large amounts of FDI (spurred by the liberalization of retail FDI in many countries in the 1990s) and competitive domestic private investment, by the privatization of retail parastatals, by rising incomes and urbanization, and by procurement system change (discussed below). A literature on this rapid diffusion emerged mainly in the 2000s. The studies showed the spread of modern retail in three waves, earliest in South America, East Asia outside China, and north-Central Europe and South Africa, then in Central America and Mexico, Southeast Asia, and south-central Europe, and finally, and most rapidly in China, India, Russia, Vietnam, and emerging in Southern/Eastern Africa. Within a given country, supermarkets penetrated product categories in waves as well: first processed, then semi-processed, and very recently, into fresh produce. As supermarkets and fast-food chains spread, the segments underwent consolidation and multinationalization (Reardon et al. 2003; Reardon and Timmer 2007).

Another vector of effect of exposure by food systems in developing countries to modern retail is via exports to developed country food retailers. An example is literature on UK supermarket chains sourcing fresh produce from Kenya, and applying stringent private standards of quality and safety (Dolan and Humphrey, 2000).

In sum, restructuring of the agrifood industry in all three segments has been occurring since circa 1970, but it has been in particular since the early/mid 1990’s in the liberalization/globalization stage that restructuring has greatly accelerated, been dominated by the private sector, and been characterized by consolidation and multinationalization. In turn, this

restructured food industry has begun, over the 1990s and 2000s, to modernize their procurement systems in ways discussed next.

(b) Strand: The restructured agrifood industry's procurement system modernization

Here we focus on the already-restructured agrifood industry, in the liberalization/globalization stage. Modern food industry companies have perceived constraints, by using only traditional procurement systems, to realizing competitive advantage in competition with the traditional sector and with each other. The traditional procurement systems involve buying in the "spot market" from traditional wholesalers of processed and fresh food products. To remedy this, there has emerged an alternative procurement technology, "modernized procurement systems." This emergence is crucial to the special issue because it is only to the extent that procurement systems modernize does the restructuring of the food industry "translate" into a transformation of the market facing farmers.

Procurement system modernization includes (Reardon and Berdegue 2002) three elements: (1) a shift from no standards or public standards to use of private standards quality and safety; (2) a shift from spot markets relations in traditional wholesale markets to use of vertical coordination mechanisms; the latter include explicit contracts or implicit contracts such as preferred supplier lists, and market inter-linkages such as linking output procurement to provision of credit or inputs; and (3) a shift from local procurement by each store, to centralized procurement using distribution centers, coupled with a shift to procurement catchment area broadening from local into sourcing via national, regional, and global networks.

There is substantial unevenness in the rates adoption of procurement system modernization over countries, food industry firms, and products, but there are several salient patterns of diffusion. Adoption is earliest and fastest among leading agrifood industry firms, in intermediate

and advanced restructuring countries, and in processed (milled grains, packaged foods) and semi-processed (meat, dairy). Only recently (roughly since 2000) have both modern retail and procurement modernization emerged in fresh produce.

The main lines of the recent literature on the adoption by modern food companies of the elements of procurement modernization are as follows.

(i) Public to private standards

Public standards of agrifood quality for domestic market development have long featured in the development literature (e.g., Abbott 1967). Diffusion of minimum public quality standards for grain, and quality and safety standards for meat and dairy were part of the pre-liberalization/pre-globalization stage, linked to public investments and interventions in grain and meat wholesale markets, slaughterhouses, and cooperative milk programs such as Operation Flood in India. Public standard diffusion in the liberalization/globalization stage focused on food safety and phytosanitary standards in perishables, particularly meats and fruits and vegetables, due to the soaring trade in these products (Stephenson 1997).

Private standards for quality and safety of food products arose mainly in the 1990s when modern agrifood industry companies in developing countries began adopting private standards to substitute for missing or inadequate public standards, to differentiate their products to compete with the traditional sector, and to provide an incentive to producers to increase quality. Meeting private standards typically requires greater investment by suppliers in new farming technologies and post-harvest handling, relative to traditional markets. They imply production and post-harvest technological change relative to traditional practices for traditional markets, and thus additional threshold investments by farmers (Reardon et al. 1999). Examples include wheat flour

products to domestic companies and shredded coconut to Nestle in Brazil (Farina 1997, and Farina et al. 2000). A parallel diffusion of private standards was taking place over the same period among global retailers and processors (Fulponi 2006) and that process indeed influenced the development of private standards in developing countries.

(ii) Spot market relations to vertical coordination institutions

These latter include contracts and various forms of market inter-linkages such as between output and credit markets, where a wholesaler provides credit to a farmer in return for the farmer selling his/her output to the wholesaler. Attention to these institutions has long been a staple of the development economics literature. These institutions address the ubiquitous problems of missing or idiosyncratically failed factor, credit, and output markets, asymmetries of information between buyers and suppliers, and buying or selling hold-up problems. But the complexity and extent of these institutions have increased with agrifood industry transformation, and the literature treating these institutions has developed in parallel to this transformation in three waves.

The first wave of this literature was in the 1960s-1980s. It focused on traditional peasant agriculture. For example, Bardhan (1980) and Eswaran and Kotwal (1985) model agrarian contracts embodying market inter-linkage provisions in the presence of missing markets for managerial services and other factors, and review work from the 1960s and 1970s on such institutions where markets were missing in technical know-how, managerial availability, bullocks, credit, and family labor.

The second wave of this literature was an extension of the first wave, enriched by the theoretical contributions of the emergence of “new institutional economics” in the 1970s-2000s.

It still focused on peasant agriculture in the presence of tradition markets, rather than the context of agrifood industry modernization. The context of the analysis also evolved with the onset of structural adjustment in the 1980s, which reduced or eliminated public support systems that had partially assured the existence of some markets that after went missing, such as public credit (Hoff et al. 1993, Jaffee, 1995, Fafchamps, 2004).

The third wave of this literature, 1990s to present, co-evolves with the agrifood industry transformation. This literature builds on the earlier two waves, but because the institutional arrangements in the new era are in many ways more complex, and the market challenges (such as dual direction buying/selling holdups) are novel, the new literature is innovative.

For the domestic processing segment, an example is Gow and Swinnen (1998), focusing on contract enforcement and hold-up problems in the sugar industry in Slovakia in the context of the shift from a social public-support and control system for agriculture to a capitalist market, and of financial distress in the farm and processing sectors. They analyze how a multinational sugar company resolved idiosyncratic market failures facing sugar beet farmers via provision of credit, inputs, and technical assistance.

For the fresh produce segment, Dolan and Humphrey (2000) examine UK supermarkets' coordination mechanisms sourcing from Kenyan producers. For the domestic supermarket segment for fresh produce (in which procurement modernization is in bare incipience), an example is Berdegue et al. (2005), examining recent modernization fresh produce procurement systems in Central American supermarkets, finding uneven adoption of procurement modernization over products and retail chains, and identifying the emergence of specialized/dedicated wholesalers as coordinating agents for supermarkets in the sourcing by the latter from farmers, and dedicated to sorting, packing and delivery to supermarkets. This paper,

and Reardon and Berdegue (2002) show that the “procurement-shed” (the area from which companies source) is expanding from local to national networks to regional to global networks. Global and regional multinational chains in developing countries are increasing the amount they are involved in international trade of perishables as well as processed foods – both via sourcing from the regional and global networks to supply their stores in developing countries, and using “export platforms” in the latter to export to their stores in developing countries as well as in developed countries. This is a very recent phenomenon in fresh produce, and may have important effects on trade patterns over time, as well as constitute a new opportunity (to export via these channels) and challenge (to compete with increasing imports) for local farmers (Reardon et al. 2007a).

The above procurement system changes can be hypothesized to affect farmers’ participation in modern markets and their net incomes. We turn to that next.

(c) Strand: Determinants and Impacts of Farmers Participation in Transformed Markets

Recall that the two research questions of the special issue are: (1) does agrifood industry transformation (as a “shock” to the food market system) “exclude” or “include” small farmers, and what determines that participation; and (2) what is the effect of that participation on net incomes of farmers and farm workers. Based on the above review we now have explicit the nature and extent of the “shock”. Now we turn to a review of the literature on the determinants and impacts of farmers’ participation in transformed markets.

We begin with a simple heuristic model of a modern agrifood company’s adoption of procurement modernization, and a farmer’s choice to supply to that company. From there we outline recent evidence of the latter choice.

(i) Heuristic Model of Company Decision to Modernize Procurement and Farmer to Supply the Modern Channel

We draw on elements of Key and Runsten (1999), Reardon et al. (2003) and Swinnen and Vandeplass (2007) to outline the heuristic model. We consider these broadly as decisions of adoption of “technologies” (of procurement and of output marketing). These decisions are functions of: (1) incentives in the modern channel relative to those of the traditional channel; and (2) the capacity of the firm or farm to undertake the technologies, including capacity to make needed investments.

First, the company decides on procurement modernization as a function of the following. (We abstract from the “make or buy” decision.) We assume a predetermined target product-quality and volume that the firm needs to procure. We at first abstract from the choice of from which type of supplier the firm procures using the modern procurement system.

The first set of determinants are “incentives” (measured as relatives or differentials between modern versus traditional): (1) relative price of the product (composed of the farm-gate price plus the transaction cost), which reflects a quality-differential from the output market accessible via the quality control feasible only in a modern procurement system; (2) the relative cost of the modern procurement technology (including physical costs, such as the distribution center, and management and governance costs, such as enforcing contracts and provision of credit and inputs to small farmers who are constrained in accessing them); (3) the relative market risk, such as of suffering shortfalls in supply, or of contract violation.

The second set of determinants is the company’s “capacity” to make the investments needed for the modern procurement system: (1) financial and managerial capacity to make

capital investments (such as building a distribution center); (2) the firm's financial capacity to make above-market-rate payments to induce farmers to not violate the contract (such as side-sell to the traditional channel).

Adoption would increase with the payoff to quality, decrease with relative costs and increase with capacity of the company. These hypotheses track roughly the patterns noted above – that procurement modernization tends to be among larger retail chains and processors, in first and second wave countries, where there is a combination of demand for quality from the middle class, and the modern market has penetrated the food markets of the poor and needs to save supply chain costs to sell products cheaply to that segment, and where it is relatively difficult to obtain the needed quality from traditional channels.

Now we relax the abstraction from choice of whether the company buys from small farmers (versus large farmers). We find the hypotheses about the company's choice are more ambiguous and dependent on the context. (1) All else equal, small farmers represent for the company larger transaction costs, depending on whether the farmers aggregate their output via a cooperative (thus essentially constituting one larger supplier from the company's viewpoint). (2) While small farmers have higher capital costs, they may have lower labor costs, potentially outweighing economies of scale of larger farmers. The cost differential depends on the elasticity of substitution between labor and capital. (c) If the company only has small farmers in its procurement-shed, it can assist small farmers with various inputs and credit as discussed above. (d) Larger farmers may be a riskier source, as discussed above.

Second, the farmer's choice of participation in the "modern channel" is a function of the following.

The first set of determinants are the “incentives”: (1) the relative net price of the product (measured as the farm-gate price less transaction costs), controlling for product quality; this differential reflects the premium paid by the modern channel for a given quality of product; (2) the relative cost and risk of the farm and post-harvest handling technologies to meet the product quality and transactional requirements of the modern channel compared to the traditional channel.

The second set of determinants are the farmer’s “capacity” to make the investments needed to access the modern channel: (1) the farm’s assets, including land, and non-land assets such as irrigation, needed to meet quality and consistency requirements of the modern channel; (2) collective capital such as vehicles and warehouses owned by the cooperative, and access to public infrastructure such as roads; (3) access to company, NGO, or government assistance in terms of credit, inputs, information, and so on.

As in the company’s choice of small versus large farmers, there is theoretical ambiguity in the hypotheses concerning choice of participation in the modern channel by the small farmer, for the following reasons. (1) While smaller farmers usually have less wealth and are thus more sensitive to risk, the risk differential between the market channels is not obvious a priori; a contract could make risk lower, but use of new production technologies could make risk higher. (2) Small farmers may face higher costs of access to capital (such as in Kenya, see Carter and Wiebe 1990), but lower price for own-labor. (c) Small farmers may have sufficient non-land assets to meet the channel’s requirements, but lack individual economies of scale. Yet small farmers may compensate for small individual scale with collective scale.

(ii) Emerging Evidence of Determinants of Participation

The above discussion hypothesizes that large companies want to and can adopt procurement modernization. This reflects the empirical trends we discussed. However, our theoretical discussion points to ambiguity in whether companies source from small farmers, and whether small farmers can or want to supply large companies. We show below that this theoretical ambiguity is roughly reflected in emerging empirical evidence that is mixed (companies source from large and small farmers), but nonetheless with some fairly systematic patterns conditioned by context.

First, there is evidence of exclusion of small farmers in the context of “scale-dualism in the farm sector”, in which case companies have the option of sourcing from large farmers.

Examples for the export segment include the following. Carter and Mesbah (1993) show for Chile that fruit packing and export firms source only 10-15% from small farmers, and the rest from large. Dolan and Humphrey (2000) show for Kenya that there was a rapid consolidation in the export sector over the 1990s, sharp reduction in sourcing from small farmers. By the late 1990s, large exporters were sourcing 40% from their own farms, 42% from large commercial farms, and only 18% from small farms. Exporters reported that they sourced thus to control quality and food safety and reduce transaction costs.

Examples for the processing segment include the following. Farina et al. (2005) show, for Argentine and Brazilian modern dairies, a sharp shift in sourcing from small to medium/large farmers as the dairy processing sector consolidated and multinationalized over the 1990s, private quality standards increased (mainly to reduce costs in processing), and intense cost competition emerged among processors.

Examples for the supermarket sector are as follows. Berdegue et al. (2005) for Guatemala, and Reardon et al. (2007) for Mexico, show that the leading chains mainly source from large

grower/shippers when facing a scale-dualistic sector such as tomatoes in Mexico or bananas and mangoes in Guatemala. The chains source from small farmers when they face a sector dominated by small farmers, such as tomatoes in Guatemala and guavas in Mexico.

Second, nevertheless, there are several interesting exceptions to the above-noted pattern. There is evidence of large companies sourcing from small farmers even when large farmers are accessible.

(a) Larger farmers may have a broader set of market options, such as exports, and so are considered by companies a riskier sourcing option. This is noted by Milicevic et al. (1998) for the tomato processing sector in Chile, Dries and Swinnen (2004) for the dairy sector in Poland, and Codron et al. (2004) for vegetables and supermarkets in Morocco.

(b) Smaller farmers may be more able and willing to follow the highly labor intensive field management practices needed by the companies. For example, von Braun et al. (1989) show in Guatemala that large exporters of vegetables in the 1980s moved from plantation-style own-production, to medium farms, and finally to contracts with small farmers because of the capacity of the latter to supervise closely family labor and perform intense and careful field practices.

c) Small farmers may be able to reduce transaction costs to companies by forming effective marketing cooperatives. For example, Bakshi et al. (2006) show this for the farmer company “Mahagrapes” in India, and von Braun et al. (1989) show this for the Cuatro Pinos cooperative in Guatemala. However, Berdegue (2001), using data on “new generation cooperatives” from Chile, considered much superior to traditional cooperatives in dealing with modern markets, that still the vast majority of cooperatives of this type that were created in the early 1990s ended up bankrupt. He found that those that succeeded had to have a complex set of assets, institutional arrangement to discourage free-riding, and careful management, and that this combination is

rare, and while it is relatively easy for cooperatives to enter modern markets, it is rare and difficult for them to be able to sustain their participation by evolving with the market's requirements and making the needed investments and adjustments.

(d) Food industry companies sometimes use “resource providing contracts” (Austin, 1981) that address small farmers' constraints to access to credit, farm inputs, extension, and output procurement. The provision of these resources resolves “idiosyncratic market failures” for small farmers and makes them competitive with large farmers. Governments and NGOs may also provide the resources used in these contracts. The use of this kind of contract is an important phenomenon for this special issue, so we provide several illustrations. There are a number of examples in the literature of “resource provision contracts” by companies for small farmers in Latin America in the 1980s and Central & Eastern Europe in the 1990s.

For the processing sector, several examples follow. For the Mexican frozen vegetables sector in the 1980s, Bivings and Runsten (1992) found substantial variation in sourcing practices over large processors: (1) own farming only; (2) only contracting from large farmers; (3) contracting from large and small farmers; (4) contracting only from small farmers via “resource provision contracts.” One multinational company that was contracting from both large and small farmers had seven contract types ranging from no resource provision for large farmers to highly resource-providing contracts for the smallest farmers (providing the latter specialized inputs and equipment, credit, technical assistance, and insurance). One similar company used its own agronomists to directly apply pesticides on small farms in order to meet strict private standards of their clients. We see this model again below in the Hortico case in Zimbabwe, and the Madagascar paper in this volume. For the weakly scale-dualistic dairy sector in Poland in the early 2000s, Dries and Swinnen (2004) found that a number of dairy companies used resource-

providing contracts with small farmers. They show that this led to many of the small farmers increasing their land size and increasing their holdings of assets such as cooling tanks.

For the fresh horticultural export segment in the 1990s and 2000s, in a number of countries exporters began using resource-providing contracts with small farmers in situations where there are no large farmers, or to broaden their supply base beyond the limited large-farm base into the masses of small farmers - but at the same time to meet increasingly strict private standards for quality and safety imposed by developed country supermarkets. For Zimbabwe, Henson et al. (2005) analyze Hortico Agrisystems. In the early 1990s, this company sourced vegetables for export only from large farmers. But by the late 1990s, Hortico found it increasingly difficult to source from large farmers because policy change induced the latter to shift to tobacco. So Hortico instead began sourcing from thousands of small farmers using a resource-providing contract scheme. Hortico's agronomists applied the pesticide on the small farmers in order to control the input to meet export standards. Hortico also provided technical assistance, inputs, credit, collection, training, and price risk management in the contracts.

In an echo of the Latin American literature in the 1980s/early 1990s, research in Africa in the 2000s showed that a number of companies used mixed sourcing from small and large farms, and differentiated their contract type by farm size and by final market segment. Jaffee and Masakure (2005) found in Kenya that produce export markets became more demanding from the mid to late 1990s, and shifted to three – co-existing – strategies by the early 2000s, with sometimes all three used by a given company among the dominant dozen exporters: (1) backward integration, relying on the exporters own farm, for “high care”, traceability-demanding products; (2) intense high-control “resource-provision contract” outgrower schemes with small farmers; (3) use of

small farmer outgrowers for less demanding products and segments, demanding less traceability and lower technology, with the company providing only extension.

Third, the literature shows emerging evidence of exclusion of some types of small farmers (those with limited non-land assets) even in contexts dominated by small farms, but where there is an unequal distribution of non-land assets. This is again consistent with the heuristic model presented above, and with the practical needs of the modern food industry, which requires consistent volumes and quality, and thus seeks small farmers having irrigation, greenhouses, and other non-land assets, and seeks low transaction costs, and thus seeks small farmers close to roads and with vehicles.

Several studies have shown that the small farmers' non-land assets were crucial "threshold investments" for "inclusion" in modern food industry channels. (1) For the processing segment, this is illustrated: for dairy in Poland by Milczarek-Andrzejewska et al (2007) where on-farm cooling tanks were the needed threshold investment, and for strawberries to modern processors in Mexico, by Berdegue et al (2008), where having crop-specific farm equipment was a key requirement. (2) For the supermarket segment, this is appearing in recent and emerging research, for example on fresh tomatoes by Hernandez et al. (2007) and Natawidjaja et al. (2008) for Guatemala and Indonesia, respectively. Both these studies are in contexts highly dominated by small farmers (average 1 ha), but with skewed distribution of average 1 ha) dominated sectors, and both in areas with skewed distribution of non-land assets like irrigation and access to roads. Also, in both contexts, supermarket chains source mainly via specialized/dedicated wholesalers charged with finding and engaging small farmers with such assets.

(iii) Emerging Evidence of Effects of Participation

Most of the studies noted above tend to show that farmers participating in the modern food industry channels, compared to those only in the traditional channels, have greater net earnings per ha or per kg marketed. This is due to a combination of several possible factors.

First, the modern company may (controlling for product quality) pay a higher price for the product in order to reward (“lock in”) the farmer for supplying to that channel and thus reduce its risk of inconsistent supply and in search costs for new suppliers. Or, the company may not pay a higher price, but: (1) the net price to the farmer may be higher (than in the traditional channel) because the company provides, via resource provision contracts, various implicit subsidies via inputs and credit, as discussed above; or (2) the market risk of the transaction is lower for the farmer due to explicit or implicit contracting via informal preferred supplier relationships (as in the Guatemala as shown by Hernandez et al., 2007).

Second, the company may allow or require sorting, and pay a higher price for higher quality product. It appears common that the traditional channel does not allow or reward quality differentiation (as illustrated for the Indonesia tomato sector by Natawidjaja et al. 2007).

Third, the modern channel may be sourcing a high-value product for which there is no local market, such as illustrated for export vegetables by von Braun et al. (1989) in Guatemala. That “exotic crop” may pay more: the above Guatemala farmers earned 60% more for export vegetables than local traditional market vegetables. Or, while the exotic export crop may be riskier to produce, the modern channel may insure for that risk with de facto insurance to small farmers (as Bivings and Runsten 1992 note for Campbells in Mexico in the 1980s).

Fourth, the impacts of the modern channel can be indirect. The effect can be on overall crop productivity; von Braun et al. (1989) showed the farmers’ participation in export cropping raised their farms’ maize productivity. The effect can be on the labor market in the area via increase in

labor use in general and hired labor in particular, both on-farm and in packing plants. This was observed in the Chilean fruit export boom areas (e.g., Jarvis and Vera-Toscano, 2004) and in vegetable export zones in Guatemala (von Braun et al., 1989) and Senegal (Maertens and Swinnen, 2007).

There is an important caveat concerning the methodology of studies of impacts of participation in modern market channels: most if not all the studies are cross-section studies. It would take a panel data study to confidently estimate what portion of the greater earnings of the farms in the modern channel is due to participation in the channel, versus due to intrinsic characteristics of the farmer that allowed him/her to perhaps have superior earnings before entering the modern channel. Some studies at least control for lagged assets in the participation regression, but many just use current assets, and thus cannot identify causality. This methodological problem is in general a research gap to be addressed in future research; none of the papers in the special issue do so.

The above review points from the extant literature set the context for the introduction of the volume's papers, next.

3. INTRODUCING THE CONTRIBUTIONS IN THE SPECIAL ISSUE

We present the papers classified by the food industry segment: export market (to foreign supermarkets), domestic processing, and domestic retail and wholesale.

(a) Transformation of the export market's impact on farmers

(i) Vegetable exports from Madagascar

Minten et al. (this issue) study the impacts on small vegetable producers of exporting to European supermarkets via Lecofruit, an export company in Madagascar. Lecofruit sources from 9,000 small farmers using “resource-provision contracts” generally similar to the ones in Kenya, Mexico, and Zimbabwe that we reviewed in section 2. Lecofruit uses a high-control, high-support scheme to assure quality, meet strict private standards of European supermarkets for pesticide residuals, and resolve the idiosyncratic market failures facing small farmers by provision of inputs and credit. All farmers all use identical inputs distributed on credit by Lecofruit to the farmers. Company extension agents closely monitor and instruct the farmers in the harvesting and in the application of fertilizer and composting. The spraying on-farm is done by the agents. The company has collection centers in the villages and monitors closely and castigates “side-selling” by the farmers to wholesalers. The authors undertook a survey of 200 farmers in the contract scheme. 2There is no control group, because there is no similar high-value quality-assured vegetable grown for the domestic market.

The paper contributes in two ways to the literature. (1) The study descriptively and econometrically shows that in the presence of resource-provision contracts there are positive impacts on net vegetable incomes, income stability, and spillovers on rice productivity of the farmers participating in the scheme. These results are thus similar to the small-farmer-including results from the Mexican, Guatemalan, and Zimbabwe studies reviewed in section 2. (2) Most African case-study literature on vegetable exports is based in scale-dualistic settings. The Madagascar case is instead in a small-farms-only context for vegetables.

(b) Transformation of the processing sector’s impacts on farmers

(i) Dairy in Central & Eastern Europe

Studies of impacts of dairy sector transformation on farms have produced contrasting results because they have been undertaken in widely different contexts: (1) sharply scale-dualistic contexts like Brazil and Argentina, where large processors shifted over time from small to medium/large farmers; and (2) only weakly scale-dualistic contexts like Poland where dairy processors work mainly with small farmers using resource-provision contracts. While these cases show a systematic pattern, they are from different regional contexts. Thus, there is a gap in the literature to control for region and compare across countries. Swinnen et al. (this volume) address this gap with a paper on the dairy sector in Central and Eastern Europe. They compare across countries that have different levels of dairy sector transformation, but share a common past of state control of the food sector followed by market liberalization and privatization in the 1990s. The countries include: (1) relatively high income countries including Poland (most advanced dairy processing restructuring, with some corporate farms but mainly small farms dominant), and Slovakia (with less advanced dairy processing restructuring, and corporate dairy farming dominant); (2) intermediate income countries, Bulgaria and Russia (with intermediate restructuring of dairy processing, and mixed small farm and corporate farm dairy farm sector); (3) and a low income country, Albania (with little restructuring and tiny farms). The authors conducted interviews with a reasoned cross-section sample of dairy companies (large and small, foreign and domestic, private and cooperative) in the above countries. They also undertook farm surveys mainly in small farm areas or weakly dualistic areas, in Poland, Bulgaria, and Albania.

The company interviews showed that in the higher and middle income countries, vertical coordination mechanisms (contracts with product delivery and pricing specifications) and resource-provision contracts were widespread. They observed a strong correlation between the “completeness” of the set of support for the farmers in the resource-provision contracts, and the

degree of transformation or income of the country; hence, in Poland, it was much more common to find bank loan support in the contracts drawn up by the companies, than in Bulgaria, and in Albania, to find no contracts or farmer assistance. The determinants of the greater vertical coordination in the advanced cases are a combination of public standards imposed by the European Community and private standards imposed by supermarkets and large processors, and thus the degree of coordination and assistance needed.

The authors' farm surveys show that in Poland, the company investment support and loan guarantees had an impact on farmers' investments in cooling tanks, collection centers, and feed. In Poland and Bulgaria, while companies expressed a preference to source from large farmers, in practice they source mainly from small farmers, partly because the great majority of dairy farmers in the farm survey countries are small farmers. But even when larger farmers are available, the companies follow mixed sourcing from small and larger farmers, given that contract enforcement is often harder for the latter (as we discussed for other cases in section 2).

(ii) Tea processing in Sri Lanka

Weersink and Herath (this volume) contribute to the literature by documenting a case of large processors shifting over decades from sourcing from own-plantations, then to large farms, and then to small farmers. This is a similar path to several cases discussed above those of Guatemala (von Braun et al. 1989) and Zimbabwe (Henson et al. 2005). While the Sri Lanka paper shares with these export papers the treatment of highly labor-intensive crops (tea and vegetables), in which small farms can have an advantage, the Sri Lanka shares with the Zimbabwe paper on Hortico Agrisystems the importance of policy change shifting exporters away from large toward small farmers. The authors note that historically Sri Lankan tea processors could source from

own-plantations (vertical integration) or from large farms, minimizing transaction costs that would be higher had they sourced from small farmers. Yet the share of vertically integrated tea production-processing plummeted from 93% in the 1960s, to 40% in 2004. They model that decline as a function of: (1) quality requirements in the output market; (2) transaction costs; (3) management and governance costs; (4) relative risks between making and buying; and (5) production costs faced over different sourcing options on the supply side. The authors analyze each of these determinants historically, and link changes in these determinants to policy changes. Their key findings are as follows. (1) Small farmers had little incentive to supply to large processors until market regulations in the 1960s-1980s were introduced which solved pricing and payment holdup problems. (2) The introduction of labor laws drove up labor costs on the plantations, driving processors to source from small farmers who use their own unregulated and cheaper labor. (3) Privatization of public sector processing companies in the 1990s drove up (formerly subsidized) management costs of running plantations.

(iii) Vegetable Packing/Processing in China.

Stringer et al. (this volume) analyze the decisions of vegetable packers/processors concerning the type of farms from which they source. They undertook a survey of 52 vegetable processing companies in Laiyang, in the leading vegetable producing province, Shandong. Ten alternative channels, representing combinations of sourcing channel attributes, were presented in a questionnaire to the processors, and they were asked to rank the channels. The attributes included: (1) size of the production unit, whether small (individual farm), or large (group of farmers); (2) degree of control over quality and delivery, proxied by the use of a simple contract (of price and quantity) versus a more complete contract with input types, delivery schedule, and

quality standards specified; (3) distance from the producer to the processing plant; (4) food safety certification of the production unit. The attribute ranking of the choices of the companies was then performed using conjoint analysis. The results show that the processors mainly value channels that provide attributes that minimize transaction costs of contracting, purchasing, handling, and supervision. Scale (and thus use of farmers' groups) ranked first, then distance, then type of contract. Food safety certification was ranked low. The ranking was not sensitive to scale of processing firm, nor degree of export orientation. This latter may be explained by the fact that most of the produce goes to the South Korean or domestic market, and only a minor share goes to the more food-safety demanding Japanese market.

(iv) Apple and Green Onion Packing/Processing in China

Miyata et al. (this volume) contribute to the literature by testing for the farm size and non-land asset determinants of participation in contract schemes in Shandong. The study examines four packing/processing companies that export to supermarket chains in Japan, China, and Singapore, and also market apples to large supermarket chains in China. The large supermarket chains in China and Japan require food safety testing. The authors' interviews show that the companies each have a diversity of sourcing practices, echoing the Kenya study reviewed in section 2. The companies source from: (1) own-farms using hired labor on land rented from villages; (2) independent growers, not under contract; (3) farmers under "resource-provision contracts". The latter are similar to those we have discussed above in other countries: the companies provide credit for pesticides (mainly to control the types and amounts used), technical assistance to meet quality standards, and price premiums above market prices to reduce "side-selling" by farmers. To lower transaction costs, packers/processors chose villages that are near

the plant, and then work mainly with the village leader to find farmers who have enough land, the right type of soil, and who are clustered in order to reduce transaction costs of collection.

Miyata et al. undertook a survey in the sourcing catchment area of the companies. The sample included 160 apple and green onion growers, among which a treatment group under contract with four packing/processing companies, and a control group randomly chosen from the same villages. The growers have very small farms, from 0.4 to 1 ha. The authors used the cross-section data to estimate the determinants and income effects of farmer participation in the contract scheme. Several key points emerged. (1) For apple farmers, the results show that farm size was not significant. This is perhaps not surprising as all are small farmers, but there was no exclusion of even the smallest of the small farmers. However, as in the Guatemalan and Indonesian studies of small farmers reviewed in Section 2, in Miyata et al.'s results, non-land assets are important determinants of participation. The key assets are productive assets and the age of the orchard (a proxy for pre-determined productivity). Farms closer to the village head's location were more likely to participate, with possible reasons being transaction costs of monitoring, collection, and social networks. (2) For onion farmers, while all farmers are small, the smallest tended to not participate (apparently because of higher transaction costs of collection). Again, non-land assets were important to participation, in particular having irrigation, presumably because the companies require consistent quality and output demanded by the packers. (3) For both crops, participating in contract farming, controlling for other factors, was correlated with higher incomes. Seventy-five percent of the contract farmers noted that their incomes had risen relative to before entering the contract.

(c) Transformation of the retail and wholesale sectors' impacts on farmers

(i) Fresh Produce in China

Wang et al. (this volume) study marketing of fresh produce from farms in the Beijing area. They undertook a survey of 500 farms around Beijing. The area is characterized by all small farms and relatively equal distribution of non-land assets like irrigation. There are two key results. (1) There is a rapid shift from grain production to horticulture. Entry into the latter is happening fastest among farmers furthest from Beijing and in the poorest villages, and slowest among the richer farmers nearer Beijing who tend to be diversifying their incomes off-farm. (2) Despite significant transformation of the urban retail sector, and moderate transformation of the fresh produce wholesale sector, little impact is transmitted upstream to farmers. The reason is that in the Beijing area, supermarkets source the great bulk of their produce from the wholesale markets. The thousands of small wholesalers and brokers in those markets source via spot market transactions from thousands of small farmers. Absent are the sorts of contractual relationships discussed above, and there is only the barest emergence of specialized wholesalers dedicated to modern channels (of the type discussed in section 2).

(ii) Kenyan supermarkets and horticulture

Neven et al. (this volume) examine sourcing practices of supermarkets in Nairobi and the participation of farmers in supplying fruit and vegetables to supermarkets in Nairobi. They interviewed supermarket chains in Nairobi and found that the chains source from wholesale markets and from mainly medium-sized farms near Nairobi. They undertook a farm survey of horticulture farmers in the 100 km perimeter around of Nairobi, the main produce source for the city. Following are the salient results. (1) Commercial, medium-sized horticultural farmers have emerged and are selling to supermarkets in Nairobi. These medium farmers are mainly black

entrepreneurs who in many cases have converted peri-urban livestock or grain farms to horticulture. The interest of this result is that this group is a new “horticultural middle class” the development of which is induced by urban market transformation, growing up as a third pole in the formerly dualistic context composed of large growers focused on exports and small farmers selling to the traditional market. (2) Small farmers largely do not participate in direct sales to the supermarkets. (3) In an echo of the results of studies in Chile, Guatemala, and Senegal discussed in section 2, this Kenya study showed significant positive labor market externalities from the emergence of the middle-sized horticulture farmers, who rely heavily on hiring labor from local small farm households.

(d) Retail transformation and the New Food Policy Agenda

Timmer (this volume) concludes the special issue with a view of the implications of the findings, especially regarding supermarkets, for food policy. He notes that the transformation of the agrifood industry should be seen in the perspective of the overall long-term structural transformation of the economy. He challenges us to consider the ways in which the retail transformation can be harnessed as a motor for overall food system development, and for increasing the health and nutrition and even food security of consumers, and providing opportunities to farmers.

4. CONCLUSIONS

This introductory article presented the objectives and issues of the special issue, reviewed existing literature on developing country trends in agrifood industry transformation (restructuring

of the sectors and procurement system modernization by companies in the restructured sectors) and its impacts on farmers, and previewed the key points of the articles in the special issue and noted their contributions to the literature.

Our review of the literature showed several salient results. (1) There has been rapid agrifood industry restructuring in the 1980s-2000s. Among companies in the restructured segments, there has been significant diffusion, albeit uneven over products, countries, and companies, of procurement system modernization. The latter includes the shift from public to private standards, shift from spot market relations to vertical coordination of the supply chain using contracts and market inter-linkages, and shift from local sourcing to sourcing via national, regional, and global networks. This modernization been adopted to reduce costs and increase quality to strategically position companies in a sharply competitive context. (2) Companies in general tend to source from larger farmers and eschew smaller farmers in scale-dualistic contexts. However, there are various exceptions to this pattern, where companies source from small farmers even when large farmers operate in the same sector. (3) Companies source from small farmers in contexts where small farmers dominate the agrarian structure. (4) When companies source from small farmers, they tend to source from the subset with the requisite non-land assets (such as irrigation, farmers associations, farm equipment, and access to paved roads). However, where companies need or want to source from small farmers but the farmers lack needed credit, inputs, or extension, companies sometimes use “resource-provision contracts” to address those constraints.

The papers in this special issue contribute to the literature in several ways.

First, the papers tend to confirm the general lines of the existing and emerging literature showing a mixed pattern of inclusion of small farmers: (1) with unqualified inclusion in agrarian

contexts where small farmers dominate; (2) with some exclusion of small farmers in contexts where there are both large and small farmers, albeit with exceptions to this pattern; (3) with the preference by companies to source from small farmers with the requisite non-land assets; (4) and with the occasional use by companies of “resource-provision contracts” where small farmers lack the needed non-land assets, inputs, credit, or extension; (5) with some situations, such as in China, where despite rapid “downstream” restructuring of the food industry, there was little to no effect transmitted upstream on the broad mass of small farmers, because the transformed food industry continues to mainly rely on the traditional wholesale market. This point emphasizes the need to add understanding of the “midstream” (the wholesale segment) in order to assess how downstream restructuring affects the upstream actors.

Second, the volume’s papers tend to show positive effects on small farmers of inclusion in modern channels, including on incomes and assets of farmers, and positive externalities to the local labor markets. The full confirmation of this point is hampered by the extant results, both from existing literature and the new papers, being from cross-section rather than panel data surveys. The latter constitutes a gap in the literature waiting to be filled.

Third, the volume’s papers confirm and extend the point that government policy affects the pace and nature of agrifood industry transformation, and influences the inclusion of small farmers. This point is a transition to the implications as follows.

While there are situations where the transmission effect of food industry transformation to farmers is still relatively weak (such as in China), in many countries the impacts are already emerging. While medium/large farmers are best equipped to face this transformation, even small farmers can be included and improve their lot via the modernizing markets, but their access to non-land assets such as irrigation, access to roads, to association, to greenhouses, and so on, is

crucial for this inclusion. In some cases the food industry companies will themselves provide access to these assets (via “resource-provision contracts”) in order to assure their farm supply base. But there is a significant and substantial and urgent role for governments to provide assets to farmers to “make the grade” for the successful participation of small farmers in the transforming food economy.

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