Chapter 1

Small Farms and the Transformation of Food Systems: An Overview

Ellen B. McCullough, Prabhu L. Pingali and Kostas G. Stamoulis

Introduction

By making a strong case for the importance of agriculture in poverty reduction, even in developing countries with largely urbanized populations, the 2008 World Development Report has continued the renewed interest in agriculture as a force for poverty reduction (World Bank, 2008). Research has shown that rural poverty reduction, resulting from better conditions in rural areas and not from the movement of rural poor into urban areas, has been the engine of overall poverty reduction (Ravallion et al, 2007). Organizational changes that are currently underway in developing-country food systems necessitate a new look at agriculture’s role in poverty reduction with an eye on the changing rural economy. The reorganization of supply chains, from farm to plate, is fuelling the transformation of entire food systems in developing countries. With the changing rural context in mind, we revisit prospects for poverty reduction in rural areas, particularly in the small farm sector. The transformation of food systems threatens business as usual but offers new opportunities for smallholder farmers and the rural poor.

The purpose of this volume is to take stock of important trends in the organization of food systems and to assess, with concrete examples and case studies, their impacts on smallholder producers in a wide range of contexts. This volume brings together relevant literature in a consistent manner and examines more holistically the issue of changing food systems, moving beyond the focus of supermarkets, which has been a dominant concern in recent literature. We focus on domestic
markets as well as exports, and on a wide range of sub-sectors, not just fresh fruits and vegetables and dairy. This chapter begins with a description of changing consumption patterns in developing countries. Then we highlight organizational changes that have taken place along the food chain, recognizing important differences between countries, and exploring interactions between traditional and modern chains in countries where food systems are transforming. We present a framework for evaluating impacts at the household level, pulling together empirical evidence in support of the framework. We close with a policy discussion on managing the transition for smallholder households, which focuses on linking smallholders into modern food chains, upgrading traditional markets and providing exit strategies for those who are marginalized by the transformation process.

The transformation: An overview

In this chapter, we lay out three different typologies for food systems that correspond roughly with the development process. The first is a traditional food system, characterized by a dominance of traditional, unorganized supply chains and limited market infrastructure. The second is a structured food system, still characterized by traditional actors but with more rules and regulations applied to marketplaces and more market infrastructure. In structured food systems, organized chains begin to capture a growing share of the market, but traditional chains are still common. The third type is an industrialized food system, as observed throughout the developed world, with strong perceptions of safety, a high degree of coordination, a large and consolidated processing sector and organized retailers.

Major global shifts in consumption, marketing, production and trade are brought about, above all, by four important driving forces associated with economic development: rising incomes, demographic shifts, technology for managing food chains and globalization. As these changes are played out, modern chains capture a growing share of the market, and food systems transform. The variable that differs most strikingly between food system typologies is the share of the food market that passes through organized value chains. We identify economic factors that explain how modern chains capture a growing share of food retail over time, and we explore specific differences between organized and traditional chains. Then we examine the implication of the spread of modern chains from the perspective of chain participants and with respect to the entire food system. In practice, the boundaries between these food system typologies are not easily discernible. Nor is the path from traditional to structured to modern a linear one. A mix of different types of chains can be found within one country depending on the commodity involved, the size of urban centres and linkages with international markets (Chen and Stamoulis, this volume).

Understanding how different types of chains relate to each other is important for predicting future opportunities for smallholder farmers as food systems reorganize. In developing countries, the food system is typically composed of domestic traditional chains, domestic modern chains and export chains, which are
usually exclusively modern. When traditional marketing systems fail to meet the needs of domestic consumers and processors, modern retailers develop mechanisms for bypassing the traditional market altogether. Modern food chains in developing countries advance rapidly due to global exposure, competition and investment, while traditional chains risk stagnation due to underinvestment. As the gap between traditional and modern food chains grows ever wider, the challenge of upgrading traditional chains becomes more pronounced. The entire food system’s transition from traditional to structured is hindered as resources and attention are diverted from upgrading traditional markets in favour of bypassing them.

Assessing the full implications of changes for rural communities and, in particular, smallholder agriculture, requires an analysis of how risks and rewards are distributed both in traditional food systems and modern ones. As production and marketing change, there are obvious implications for smallholder farmers via changes in production costs, output prices and marketing costs. But changes in processing, transport, input distribution and food retail also impact rural households via household incomes (e.g. labour markets, small enterprises) and expenditures (e.g. food prices).

From farm to plate, one overarching trend is the rising need for coordination in modern food systems relative to traditional ones, and the transaction costs that are introduced as a result. Coordination helps to ensure that information about a product’s provenance travels downstream with the product. It also helps to ensure that information about consumer demand and stock shortages/surpluses is transferred upstream more efficiently to producers (King and Phumpiu, 1996). Improving coordination along the supply chain reduces many costs but introduces new ones (Pingali et al, 2007). We explore and evaluate different strategies for coordination later in the chapter.

Towards dietary diversification

Brought about by rising incomes, demographic shifts and globalization, dietary change is sweeping the developing world. Consumers are shifting to more diverse diets that are higher in fresh produce and animal products and contain more processed foods. Shifts in food consumption parallel income growth, above all, which is associated with higher value food items displacing staples (Bennett’s Law). The effect of per capita income growth on food consumption is most profound for poorer consumers who spend a large portion of their budget on food items (Engel’s Law). A sustained decline in real food prices over the last 40 years has reinforced the effect of rising incomes on diet diversification.

Per capita incomes have risen substantially in many parts of the developing world over the past few decades. In developing countries, per capita income growth averaged around 1 per cent per year in the 1980s and 1990s but jumped to 3.7 per cent between 2001 and 2005 (World Bank, 2006). Growth rates have been most impressive in east Asia and slightly less spectacular in south Asia. Declining growth rates have been reversed since the 1990s in Latin America and
since 2000 in sub-Saharan Africa. Income growth has been accompanied by an increase in the number of middle class consumers in developing countries, particularly in Asia and Latin America, whose consumption patterns have diversified (Beng-Huat, 2000; Solamino, 2006).

Beyond income growth, dietary diversification is also fuelled by urbanization and its associated characteristics, rising female employment and increased exposure to different types of foods. Globally, urban dwellers outnumbered rural populations during 2007 (Population Division of UN, 2006). Feeding cities is now a major challenge facing food systems.

Female employment has at least kept pace with population growth in developing countries since 1980 (World Bank, 2006). Female employment rates have risen substantially in Latin America, east Asia, and the Middle East and north Africa since the 1980s.

Urban consumers typically have higher wage rates and are willing to pay for more convenience, which frees up time for income-earning activities or leisure. Therefore, they place a higher premium on processed and pre-prepared convenience foods than do rural consumers (Popkin, 1999; Regmi and Dyck, 2001). Rising female employment also contributes to this phenomenon (Kennedy and Reardon, 1994). Smaller families are typical of urban areas, so households can afford more convenience in terms of processed and prepared foods.

Globalization has led to increased exchanges of ideas and culture across boundaries through communication and travel, leading to a tightening of the global community which is reflected in dietary patterns, such as increased consumption of American style convenience foods. Urban consumers are exposed to more advertisements and are influenced by the wide variety of food choices available to them (Reardon et al, this volume).

Dietary changes have played out differently in different regions and countries, depending on their per capita incomes, the degree of urbanization and cultural factors. The most striking feature of dietary change is the substitution of traditional staples for other staple grains (i.e. rice for wheat in east and southeast Asia) and for fruits and vegetables, meat and dairy, fats and oils (Pingali, 2007). Per capita meat consumption in developing countries tripled between 1970 and 2002, while milk consumption increased by 50 per cent (Steinfeld and Chilonda, 2006). Dietary changes are most striking in Asia, where diets are shifting away from rice and increasingly towards livestock products, fruits and vegetables, sugar and oils (Pingali, 2007). Diets in Latin America have not changed as drastically, although meat consumption has risen in recent years. In sub-Saharan Africa, perhaps the biggest change has been a rise in sugar consumption during the 1960s and 1970s (FAOSTAT, 2006). Cereals, roots and tubers still comprise the vast majority of sub-Saharan African diets, and this is expected to continue into the foreseeable future (FAO, 2006). Total food consumption in developing countries is projected to increase in coming decades, so dietary diversification does not necessarily imply that per capita consumption of any food products will decline in absolute terms (Figure 1.1). However, by 2030, absolute decreases are expected in per capita consumption of roots and tubers in sub-Saharan Africa.
and of cereals in east Asia (FAO, 2004). Since cereals are used as inputs in animal production, total cereal demand will not decrease due to indirect consumption.

## Trends in food systems organization

Consumption of higher value products is on the rise in developing countries, and supply chains are ready to meet these demands. But which chains will reach dynamic consumer segments in developing countries, and which farmers will supply these chains? From farms to retail, technology and ‘globalization’ are the most important drivers of reorganization of the chains linking producers and consumers. Innovations in information and communications technology have allowed supply chains to become more responsive to consumers, while innovations in processing and transport have made products more suitable for global distribution. Technological innovation in food supply chain management has arisen in response to volatility in consumer demand (Kumar, 2001). New communication tools, such as the Universal Product Code, which came on line in the 1970s, have improved the efficiency of coordination between actors along the supply chain to shorten response times to demand fluctuations (King and Venturini, 2005). Packaging innovations throughout the second half of the 20th century continued to extend food products’ shelf lives (Welch and Mitchell, 2000). Meanwhile, a downward trend in transportation costs and widespread availability of atmosphere-controlled storage infrastructure have made it cost-effective to transport products over longer distances. Crop varieties have been tailored specifically to chain characteristics, for example to meet processing standards or to extend shelf life. Conventional breeding and, more recently, biotechnology, have allowed these shifts.
‘Globalization’ in retail and agribusiness is marked by liberalization of trade as well as of foreign direct investment (FDI). Trade has maintained a constant share in global food consumption but is shifting towards higher value products, such as processed goods, fresh produce and animal products (Hallam et al, 2004). Flows in capital can impact food systems as profoundly as flows in products. Rising FDI flows into developing countries have been linked with concentration throughout the food industry, boosts in productivity and innovation, and an increase in non-traditional agricultural exports (Wilkinson, this volume). Foreign direct investment in agriculture and the food industry grew substantially in Latin America and in Asia between the mid-1980s and mid-1990s, although investment remained very low in sub-Saharan Africa (FAO, 2004). In Asia, FDI in the food industry nearly tripled, from $750 million to $2.1 billion between 1988 and 1997. During that same period, food industry investment exploded in Latin America, from around $200 million to $3.3 billion. There is a limit in the availability of sector-specific FDI data since 2001, but economy-wide data through 2005 show a similar pattern: with long-term increases in developing countries in Asia and Latin America, with 2002–2003 slumps in both cases, and with Africa lagging behind but growing somewhat steadily since the 1970s (Figure 1.2). FDI flows into Africa have lagged behind those into Asia and Latin America because of structural and institutional constraints. The world’s least developed countries (LDCs) receive only 2 per cent of global foreign direct investment.

The transformation of food systems is not something that occurs overnight. While many of the factors that affect food systems can change rather quickly, their reorganization involves large investments in specialized infrastructure, institutional change and regulatory reform. Often, these components are jointly

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**Figure 1.2** Annual FDI net inflows into developing countries by region from 1970

Source: Data from OECD, 2007
determined rather than one causing the others. Institutions evolve as modern systems expand and infrastructure is built to accommodate the needs of the evolving markets and players. As mentioned above, multiple typologies can be observed simultaneously in the same country. Within one country, organizational change may take place earlier in chains for products that are prone to safety violations, such as meat and dairy (Chen and Stamoulis, this volume). International concerns over trans-boundary diseases (e.g. avian flu) place pressure even on non-exporting countries to upgrade supply chains in order to reduce the incidence of outbreaks and allow for better response when outbreaks occur. When a country does export food products, the onus is on the exporters to demonstrate that their products (and/or the production and post-harvest systems that give rise to them) meet the importers’ safety standards.

Country typologies by stage of transformation
Organizational changes in food systems vary in speed and extent across contexts (national, sub-national, type of product and chain), and impacts vary across households and household typologies. At the country level, perhaps the most important determinant of the transition is the country’s position in the agricultural development process. This is the path by which, over time, per capita incomes rise as the share of agriculture in a country’s work force and economy declines (Figure 1.3) (Pingali, 1997, 2006).

Countries at the low end of the transformation process are characterized by low per capita incomes, with the agricultural sector accounting for more than 30 per cent of the national GDP and over 50 per cent of the work force (FAOSTAT, 2006). In these countries, which are mostly located in sub-Saharan Africa and

![Figure 1.3](image-url)
include, for example, Zambia, Kenya and Uganda, agriculture is mainly oriented towards the production of non-marketed staples, and cropping systems are often diversified at the farm level with inputs generated on the farm (Table 1.1). Some of the surplus production is marketed, but production systems are mainly subsistence-oriented. Staple crop productivity growth remains the primary engine of overall economic growth. In traditional agricultural economies, the transformation of food systems has been slow to take off. High-value, organized retail establishments may cater to a limited, often expatriate, clientele in capital cities, but most supply chains for most crops are still traditional in nature. Developing modern, vertically integrated supply chains is difficult and expensive in countries with poor road infrastructure and failed institutions.

In Africa, there is a high degree of dualism between traditional domestic food chains and organized chains, whether domestic or export-oriented. Food safety standards for poor consumers, who frequent traditional markets, are quite low as those markets are largely informal. Another major problem is the vicious cycle of low surplus volumes constraining market development, which then reinforces the subsistence nature of low-input production systems. In sub-Saharan Africa, continued underinvestment of public goods supporting smallholder agriculture is

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<th>Table 1.1 Characteristics of food systems by country typology</th>
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<tr>
<td><strong>Traditional</strong></td>
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<td>Share of agriculture in GDP</td>
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likely to further widen the gap between traditional domestic markets and the formal processing and retail sector (Jayne, this volume). Transforming consumer demand, particularly in urban areas, will be met with imports for products that domestic supply chains cannot provide competitively. In sub-Saharan Africa, urban demand is increasingly met with imports rather than by domestic producers. According to urban consumer surveys in Mozambique, Kenya and South Africa, expenditures on wheat and/or rice were higher than those on maize (Jayne, this volume). Without proper linkages between rural producers and urban consumers, economic growth in urban areas cannot spur widespread rural poverty reduction.

In modernizing economies, the agricultural sector accounts for a 10–30 per cent share of the economy and a 15–50 per cent share in the work force. Modernizing economies, which are mostly located in Asia, Latin America and central and eastern Europe, vary greatly with respect to urbanization rates and income. Countries in Asia, such as Vietnam and Bangladesh, typically have lower urbanization rates, while those in Latin America and central and eastern Europe, such as Mexico and Honduras, have higher urbanization rates. In modernizing economies, the majority of farmers produce for domestic markets; but both subsistence- and export-oriented systems are present. Food systems in modernizing economies are neither traditional nor industrialized but somewhere in between. The more urbanized economies of central and eastern Europe and Latin America will be marked by more opportunities for marketing high-value products domestically. High rural poverty rates underscore the importance of agricultural growth for improving rural incomes in many Asian countries with lower urbanization rates. Meeting urban food demands can be the new source of growth for these economies. Further improving diversification into higher value agriculture to meet domestic urban demand is an important goal.

In industrialized economies, such as the US, the EU, Australia and New Zealand, agriculture usually accounts for less than 10 per cent of GDP and less than 15 per cent of the work force. Markets are domestically and internationally oriented; output mixes are highly diversified with a well-developed processing sector providing opportunities for value addition. Typically, industrialized agricultural systems are highly mechanized and scale economies are quite pronounced. Differentiated products flow through well organized value chains, and commodity markets maintain basic safety standards through regulation (Kinsey and Senauer, 1996).

Apart from the phase in which a country finds itself in the agricultural development process, several other factors can influence the speed and nature of the transformation of food systems (although such factors usually correlate highly with the transformation process and a country’s attractiveness to outside investors). It is important to remember that capital is mobile and policies at the national level are important determinants of the investment climate, which is affected by institutions, infrastructure, capacity and transaction costs (Globerman and Shapiro, 2002; Bénassy-Quéré et al, 2007). Stable governments and institutions provide a better environment for large capital investments; widespread graft and excessive bureaucracy can discourage investment. Agribusiness firms looking to vertically integrate
their supply chains will prefer countries where the regulatory environment is transparent and easy to negotiate. They will seek places where arbitration costs are low and coordination is easy to manage. All of these factors, which could be considered transaction costs, influence the cost of developing and managing supply chains, and therefore the competitiveness of their final products.

**Organizational trends along the value chain**

Acting at once and often reinforcing each other, driving forces have exacted and continue to exact major changes on food distribution systems. A wide body of literature, particularly from the last decade, describes the reorganization that has taken place in food chains, with implications for chain participants and for the broader economy (Table 1.2). Much of the evidence available is focused on retail,

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<th>Trends in the organization of food systems from farm to plate</th>
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<td><strong>Traditional</strong></td>
<td><strong>Structured</strong></td>
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<tr>
<td>Consumption</td>
<td>Rising caloric intake, diversification of diets</td>
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<td>Retail</td>
<td>Small scale, wet markets</td>
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<td>Processing</td>
<td>Limited processing sector</td>
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<td>Wholesale</td>
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<td>Procurement</td>
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<td>Production systems</td>
<td>Diversified, low input systems</td>
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<td>Safety in food system</td>
<td>No traceability</td>
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<tr>
<td>Vertical coordination</td>
<td>Relationships</td>
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Notes: FFV = fresh fruit and vegetables
HACCP = hazard analysis and critical control point
ICT = information and computer technology
particularly supermarkets. Many of the procurement and marketing studies focus on fresh fruits and vegetables grown for export to consumers in developed countries. The dairy sub-sector has also garnered a fair amount of attention. While not all locations, crops or stages in the supply chain have received interest proportional to their importance for rural poverty, there nevertheless exists a robust set of documented studies from which to draw conclusions about the implications of the reorganization of supply chains and resulting transformation of food systems for food security, and in particular, rural poverty.

**Retail consolidation trends**

The proliferation of supermarkets in developing countries is one of the most widely cited elements of food system transformation. Trends in consumption pave the way for consolidation in the retail sector, which then reinforces dietary changes. Demand for safe food and for processed food products provides an entry point for organized, larger scale retail outlets in urban markets. By offering a wide variety of products, supermarkets can stimulate new demand through availability and exposure. Families who own refrigerators and vehicles are able to make fewer, but higher volume, trips to purchase food, which explains the strong link between the spread of supermarkets and the rise of the middle class. Income growth is closely linked with ownership of durable goods, like refrigerators and vehicles (Filmer and Pritchett, 1999).

The spread of supermarkets has been documented in a variety of studies specific to countries and regions (see Reardon and Berdegué, 2002; Weatherspoon and Reardon, 2003; Dries et al, 2004; Hu et al, 2004). Structural transformation of the retail sector took off in central Europe, South America and east Asia outside China in the early 1990s. The share of food retail sales by supermarkets grew from around 10 per cent to 50–60 per cent in these regions. By 2002, in central America and southeast Asia, the shares of food retail sales accounted for by supermarkets reached 30–50 per cent. Starting in the late 1990s and early 2000s, substantial structural changes taking place in eastern Europe spurred growth in supermarkets, which now comprise 30–40 per cent of food retail (Dries et al, 2004). So far, supermarkets have failed to capture a large portion of food retail in south Asia (1–2 per cent), China (11 per cent), and Africa (with the exception of South Africa, 5–10 per cent), despite the high growth rates that have been reported in the organized retail sector (Traill, 2006). There are indications of a rapid rise in supermarket growth rates in China and India over recent years.

A recent study by Traill (2006) involved compilation of a cross-country dataset on supermarket penetration in developing and developed countries (Figure 1.4). Using a multivariate regression, differences between countries were explained by per capita income, urbanization rates, female participation in the workforce and income inequality. All of these factors were positively correlated with the share of food retail captured by supermarkets. It is important to stress that, in most developing countries with traditional food systems, supermarket share in retail is still limited to the 10 per cent range, even lower for the fresh
produce market segment. Low-penetration countries are unlikely to become high-penetration ones in the coming decade, even though supermarkets in developing countries have sustained impressive growth rates (Traill, 2006).

The methodology for collecting data on supermarket penetration differs from country to country, but supermarkets are usually defined as single, self-service retail outlets which exceed a threshold number of cash registers (e.g. 2–3) or floor space (e.g. 150m²) (see the definition used in Neven and Reardon, this volume). Some important changes in the retail sector could go undetected in estimates based on such definitions, such as shifting procurement patterns among small-scale, traditional retailers of fresh and processed foods, which would have implications for the producers who supply them. Also, estimates of average retail share mask differences between sub-sectors. Supermarkets’ share of fresh produce retail, for example, is consistently 25–50 per cent of supermarkets’ share of total food retail (Berdegué et al, 2005).

**Implications of consolidating retail**

The implications of retail transformation on producers have been explored through a wide range of studies. Ultimately, small farmers are impacted through changing points and terms of sale and changing safety and quality requirements for products that are purchased. Two questions pertain: Which farmers participate? What happens to those who cannot or do not? The clearest mechanism by which retail transformation impacts farmers is through changing procurement standards, particularly with respect to quality and safety of products (see

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**Figure 1.4** Rising GDP per capita is associated with a larger share of supermarkets in food retail

![Graph showing the relationship between GDP per capita and the share of supermarkets in food retail.](image)

Source: Data from Traill, 2006 and World Bank, 2006
Balsevich et al, 2003; Berdegue et al, 2005; Swinnen, 2007; Reardon et al, this volume). In order to ensure year-round availability of produce, private retailers may specify delivery standards for minimum monthly shipments throughout the growing season. The delivery requirements can serve as a barrier to smallholders directly supplying retailers (Dolan and Humphrey, 2002). Other retailer standards relate to the products themselves or the methods by which they are produced, for example, the EurepGAP\(^2\) programme (McCluskey, 2007).

When possible, supermarkets have procured through regional distribution centres with the capacity to receive shipments from farmers, bulk up orders, sort products and ship to retail locations. Since supermarkets’ distribution centres perform wholesale functions, they are discussed in the next section.

The practice of farmers selling directly to retailers is more common in fresh fruit and vegetable chains than in others. Evidence shows that supermarkets are more likely to procure directly from farmers or farmer groups in countries where supermarket penetration is still quite low, such as Thailand (Chen and Stamoulis, this volume). Relatively few farmers, small or large, supply supermarkets directly, so quality and safety standards are transmitted to farmers via processors, wholesaler and traders. The transmission of consumer preferences and retailer standards to producers depends on a number of factors, including the structure of the wholesale market.

Retail concentration in developing countries has implications for retail-related employment and for consumers. It is likely that at least some traditional retailers will be displaced by growth in the supermarket sector, leading to a net job loss in the retail sector. This hypothesis is based on the assumption that supermarkets are more capital intensive (with respect to labour) than are traditional retailers (Dries, 2005). Transformation of retail may cause consumer prices to go up or down, depending on the competitiveness of the sector, but the availability of more variety and more quality differentiation will improve consumers’ welfare as long as prices are competitive. Consumers are likely to benefit from competition between organized and traditional retailers, as well as that within the supermarket sector, which can lead to improved services overall. In India, there is concern among the public that a change in FDI policy will drive small retailers out of business by offering low prices, initially at a loss. Predatory pricing patterns have been documented in many developed countries, with impacts borne by small retailers who must compete for customers and for suppliers (Foer, 2001; Reardon and Hopkins, 2006). Across Asia, there is evidence that consumers still prefer to buy their produce in traditional markets, where it tends to be fresher (see Chen et al, 2005; Maruyama and Viet Trung, 2007; Dirven and Faiguenbaum, this volume; Singh, this volume). In Latin America, the small-scale retail sector has relied on responsiveness to consumers to maintain some resilience in the face of competition with large retailers (D’Andrea et al, 2006). Supermarkets may earn lower profit margins on fresh produce relative to other items, but offering it is important for improving loyalty among customers who place a premium on one-stop shopping.

The size of the urban middle class determines the nature of the retail clientele (Wilkinson, this volume). The more ‘mainstream’ domestic supermarket chains
become, the more they must compete among themselves on price, product safety and quality, and with traditional wholesalers on price and freshness. Price and convenience have been common entry points for supermarkets in developed countries. The consumer base will determine customers’ willingness to pay for quality, and how retailers should handle the trade-off between quality and price (Maruyama and Viet Trung, 2007). Modern retailers can out-compete traditional chains on food safety because they can implement traceability and communications technology. It appears, for now, that traditional chains can compete with organized ones on freshness and price. As the middle class grows, so will the number of organized retailers that cater to them, offering different combinations of quality, safety and economy based on consumer preferences. Asian consumers appear to be willing to tolerate a lack of traceability in modern chains, but a big public safety scare could boost demand for safe food. In the absence of a marketing opportunity posed by changing public perceptions or a regulatory shift, supermarkets will continue to procure through the traditional wholesale system.

**More processing and trade in processed products**

Processed products are capturing a growing value share in global agricultural production and trade at the expense of bulk commodities (Regmi and Dyck, 2001). Some higher income developing countries match or surpass global trends, but most least developed countries have not shared in opportunities to expand agricultural processing for domestic consumption or for export (FAO, 2006; World Bank, 2008). While the LDCs comprise 10 per cent of the world’s population, they account for only 0.4 per cent of global manufacturing value addition in all sectors (Wilkinson, this volume). Yet in these LDCs, the food industry often accounts for the largest share of manufacturing value addition. In 17 of Africa’s LDCs, over 80 per cent of the manufacturing is in the agri-food sector. In most of Africa’s other LDCs, the share is over 50 per cent.

This points to the opportunity to expand food manufacturing for domestic and export markets using domestically grown raw materials. Furthermore, quality standards for raw materials to be used in manufacturing are often not as strict as those for fresh produce. Because of lower costs of compliance, and less seasonal price variability, scale economies have been shown to be less prohibitive, and so processing channels may be more accessible to smallholders than fresh produce channels. Quality standards for green bean canning firms are much lower than those for fresh green beans in Kenya, even though both products are destined for export. As a result, the green bean processing chain has sustained smallholder participation much better than the fresh green bean chain has (Narrod et al, this volume).

With the transformation of food systems there has been a trend of upgrading and consolidation in agri-processing firms in developing countries. A shake-out of domestic processing firms has been observed with the entry of foreign firms, facilitated by the liberalization of FDI and trade (Chen and Stamoulis, this volume; Wilkinson, this volume). Competition to meet retailers’ standards cost-effectively has led to consolidation among the remaining domestic processing firms in devel-
oping countries. Consolidation of retail in developing countries has been most pronounced in sub-sectors whose processors are smaller, more independent and less advanced technologically (Chen, 2004). Small processors in developing countries reported difficulties selling to supermarkets because the retailers applied large stocking fees (Chen and Stamoulis, this volume). For example, in southeast Asia, supermarkets have catalysed major changes in the fresh fruit and vegetable packing industry but not on chicken packers, who had already adopted internationally accepted standards by the time domestic supermarkets became important buyers.

**Bypassing of traditional wholesalers**

By assembling large volumes of produce from a ‘marketshed’, wholesalers are better positioned to meet retailers’ and processors’ requirements than are individual farmers, particularly smallholders. In traditional chains, which are still widely prevalent in agriculture-based economies, farmers and traders supply traditional wholesalers, who then sell to individual retailers and processors, many of whom are small in scale. In modern chains, farmers and traders supply specialized wholesalers or distribution centres, who then sell to organized retailers and processors. In countries with modernizing food systems, both chains may exist side to side, with some exchange between them as conditions allow (Figure 1.5).

When organized retailers first enter a country, they typically set up their own direct procurement systems. Specialized regional distribution centres are constructed to serve their wholesale needs when traditional and even specialized wholesale markets cannot, and once sufficient economies of scale are present. To justify the cost of a regional distribution centre for fresh produce with the savings generated, it is estimated that a retailer needs a minimum of 20 supermarkets

![Diagram of interactions between traditional and organized chains in modernizing food systems](image.png)

**Figure 1.5** Interactions between traditional and organized chains in modernizing food systems
In the developing world, there are few regional distribution centres for fresh produce outside of Latin America. In the US and Japan, major retail distribution centres began to displace wholesalers by the 1960s (Chen and Stamoulis, this volume). More recently, there is evidence in developed countries of a shift back towards direct procurement, at least in niche markets where consumers place a premium on fresh, local and seasonal produce.

Wholesalers assemble, grade and sort produce, bridging the scale gap between producers and retailers. Traditional wholesalers can differentiate products on the basis of basic functions, like size, colour and other easily observable characteristics. But product information that is not readily observable does not transmit well through the traditional system. Specialized wholesalers are better positioned to keep track of quality information and meet more exacting demands from retailers and processors (Unnevehr and Roberts, 2002; Golan et al, 2004). For this reason, specialized wholesalers have captured important market segments in developing countries (Reardon and Berdegue, 2002; Coe and Hess, 2005; Reardon et al, this volume). For organized retailers, bypassing traditional wholesalers affords better quality control and can lower costs if savings from reduced spoilage offset the costs of managing the distribution facility. High spoilage rates in traditional wholesale markets in developing countries give retailers strong incentives to bypass traditional wholesalers.

To date, evidence of bypassing has been limited in developing countries outside Latin America (Chen and Stamoulis, this volume). With fresh fruits, vegetables and many bulk commodities, traditional wholesale markets remain vibrant, even in Latin American where supermarket penetration is high. In southeast Asia, specialized wholesalers have a small market share but play an important part in quality segmentation (Caldhilon et al, 2006). The traditional market system can accommodate some quality differentiation, but it is inefficient if quality-differentiated prices are not transmitted to producers and quality information is not transmitted to consumers (Digal, 2004). There is evidence that traditional wholesalers are responding to the spread of specialized wholesalers and distribution centres by investing in upgrades to improve quality and safety. In Chile, public and private investments were made to improve traditional wholesale markets serving Santiago, with the goal of helping wholesalers compete with private chains on quality, safety and customer service (Dirven and Faiguenbaum, this volume). Traditional markets may not be able to compete with specialized markets cost-effectively with regard to quality and safety.

From the perspective of the small-scale farmer, an important question is: who will the specialized wholesalers buy from, given the choice? And in order to compete with specialized wholesalers, will traditional wholesalers impose standards that lead to exclusion of smallholders? As retailers begin to pull a meaningful share of the wholesale market into distribution centres, what are the implications for smallholder farmers? The degree of duality between the traditional and specialized wholesale systems will determine, in part, whether the transformation of food systems threatens to squeeze smallholders out of the system altogether or just to prevent them from taking part in the most lucrative
opportunities, thus imparting distributional effects. The more permeability between traditional and organized chains in the domestic food system, the lower the barriers to participation for smallholders (Figure 1.5). The differences between traditional and specialized wholesalers with respect to prices and standards will affect farmers’ decisions on where to market their produce, along with other aspects of the point of sale that are explored below. There is evidence that specialized wholesalers can offer higher prices than traditional ones for produce that meets their standards (e.g. Schwentesius and Ángel Gómez, 2002), but as discussed below, the cost of complying with standards can eat into this price differential. Furthermore, the price differential may decrease over time as more and more producers in a location are capable of meeting exacting standards.

In Asia, many farmers are participating in organized retail chains serving domestic supermarkets without knowing it. Supermarkets in China and India have been shown to procure at least some fresh produce from the traditional wholesale market (Huang et al, this volume; Singh, this volume). In fact, smallholder fruit farmers in China’s Shandong province were found to be supplying supermarkets in Russia and central and eastern Europe via the traditional marketing system (Huang et al, this volume). To date, many Asian supermarkets have been able to scale up quickly by sourcing in traditional chains. This has been an effective strategy because there have not been major safety scares, or they have been sufficiently downplayed to avoid scandal. In China there has been a recent public backlash against the shortcomings of the public safety regulation system (Barboza, 2007). Retailers may come under greater pressure to introduce traceability into their sourcing systems in the near future.

**Formalization of procurement and marketing**

As the organization of retail leads to the specialization of wholesale, there is an expansion of formalized procurement systems designed to improve the efficiency of procurement. Formalized procurement systems facilitate the transmission of information upstream and downstream, allowing for differentiation of products based on quality and safety, and reducing the costs of coordination between buyers and sellers (Barry et al, 1992; Pingali et al, 2007). Procurement models are changing as marketing systems shift from traditional to structured to modern. Transactions in traditional markets are characterized as being ‘spot’ in nature, although relationships between farmers and traders are likely to be important in any market. Traditional markets may be regulated by institutions, such as government commodity boards, which require farmers to sell in certain channels (Jayne, this volume). Above all, traditional markets are characterized by informality, with farmers bearing many of the costs associated with poor market performance. Farmers may be charged irregular fees by various intermediaries, for example, and traders may depress prices through collusion (Omiti et al, this volume; Singh, this volume).

Structured markets are characterized by more rules and regulations set by government overseers, although not necessarily by heavy-handed direct involvement. The Agricultural Produce Marketing Committee (APMC) system in India
is an example of a well-regulated auction where farmers can expect certain basic rules of engagement. Rules are meant to standardize transactions and make the market a fairer place to do business (Singh, this volume). Governments may publish price information to reduce farmers’ information asymmetry. To some extent, farmers can access channels for arbitration when they feel that regulations have been violated. Traditional and structured markets often contain many intermediaries. When there are more intermediaries in the chain linking producers and consumers, each intermediary earns lower margins, and the overall marketing efficiency of the chain is lower (efficiency is based on the difference between producer and retail prices). Farmers and consumers lose when markets are inefficient, so, in a competitive market, both stand to gain if margins are reduced.

Modern supply chains are characterized, above all, by coordination, which usually reflects some pre-arranged agreement of the price and non-price terms of a transaction. Fewer intermediaries are found in modern chains, and upstream and downstream linkages are tighter. Improved coordination, horizontally and vertically, is an effective strategy for reducing transaction costs in modern chains. Costs associated with poor transmission of information are certainly lowered. More efficient consumer response systems reduce costs associated with the bullwhip effect which arises from delayed transfer of information about stocks from retailers to wholesalers, traders and producers (Fransoo and Wouters, 2000). When there is a disease outbreak in a food system with improved traceability, responses can be more efficiently targeted to the source of the outbreak, reducing total losses (McKean, 2001). Product traceability provides a mechanism for retailers to gain a competitive advantage on the basis of specific product attributes and for producers to gain price recognition for providing these attributes (Opara, 2003). At the same time, improved coordination introduces new transaction costs along the chain which can diminish or even completely offset the gains from coordination (Pingali et al, 2007). There are fixed, direct costs associated with building the necessary infrastructure for product differentiation and traceability. Initializing and developing more formal relationships between buyers and sellers can be a costly process, as buyers and sellers must be matched and then must negotiate terms of sale.

It is not undifferentiated commodities but products, characterized by specific attributes such as size, shape and colour, that flow through modern supply chains. Modern retailers and specialized wholesalers often use preferred supplier lists to lower their transaction costs. The buyers decide which farmers appear on the preferred supplier lists, and they often prefer larger farmers because of the fixed costs of transacting with each supplier (Pingali et al, 2007). Buyers may pass these transaction costs on to smallholder farmers or they may otherwise exclude them from contract opportunities by opting to procure from larger suppliers. There are also many reasons for and evidence of modern retailers and processors procuring regularly from smallholders. Smallholder farmers may be able to provide better quality assurance at a lower cost of enforcement. Thai Fresh United relies on many small producers, who use labour-intensive techniques to supply high quality herbs, spices, vegetables and fruits that meet their company’s strict
requirements (Boselie et al, 2003). Purchasers can also diversify their supply base and stabilize their supply stream by sourcing from smallholder farmers (Kirsten and Sartorius, 2002; Dries et al, 2004). When there are not enough larger farmers willing or able to produce the required volume and quality, buyers must turn to smallholders.

Major retailers and processors with a wide sourcing base have the ability to move goods among domestic markets, regionally or internationally at low cost given their economies of scale. Therefore, they can afford to be more price sensitive than firms with a smaller procurement base and to be more mobile in their procurement practices. Given the potential mobility of retailers with regards to sourcing, it is unrealistic to expect them or their procurement agents to pay prices that are higher than they would pay elsewhere, or to tolerate high transaction costs in the procurement process. For this reason, sustainable inclusion of smallholders in modern chains must rely on cost-effective models for bridging the scale discrepancies between individual smallholders and modern buyers.

As organized retailers and wholesalers capture a growing market share, they must assume the challenge of expanding procurement. Some must buy outside their managed chains to fill orders (Singh, this volume). Farmers and intermediaries who sell from traditional into formal chains must demonstrate, or be accountable for, the quality and safety of their produce. There are incentives for independent traders to bring produce into organized chains from the traditional market in order to take advantage of higher margins and the stability of organized outlets. These intermediaries can assume the quality risk themselves (by procuring from the traditional marketplace without paying a premium, sorting as necessary, and reselling) or they can pass the quality risk on to producers (by offering a price premium and imposing informal quality standards).

Implications and impacts for smallholder agriculture

A useful way for policy makers to conceptualize the impacts of current and future trends in the organization of food systems on smallholder farmers is to identify the incentives, opportunities and constraints they pose, now and in the future, from the small farmer perspective. The transformation of consumption and restructuring of supply chains have created new market opportunities for many agricultural producers. These opportunities may still hold fringe status relative to traditional marketing systems, but they are typically growing much faster. Rapid shifts to capital- and knowledge-intensive production technologies and the importance of scale are likely to exert pressure on smallholders to adjust, though they may lack the means to do so. If widespread ‘exclusion’ is, in fact, being observed, it could foretell difficult times for smallholder farmers as dynamic, high-value market outlets take over more of the market share. The speed of adjustment is important because it impacts the ability of smallholders to adapt to new changes and the possibility for an ‘orderly exit’ from agriculture. The latter involves
building the appropriate human capital for employment in the off- or non-farm rural sectors or for migration. It is important to note that the migration of rural poor to urban areas does not reduce poverty but rather transfers it to cities (Ravallion et al, 2007).

Smallholder opportunities should arise from areas where smallholders are able to sustain a competitive advantage, such as low supervision costs when household labour is used. Similarly, constraints relate to aspects of production and marketing that prevent small farmers from exploiting their competitive advantages, such as financial capital or lack of experience coordinating with buyers. Once situation-specific opportunities have been identified, policy makers can facilitate efforts to pursue opportunities and overcome constraints. These efforts need not require chain-specific investments, but rather broader steps and strategic investments to create the conditions that encourage others to invest, and also to create alternative opportunities for income generation by smallholders outside production.

Here we lay out key direct and indirect pathways by which the restructuring of food systems impacts both smallholder farmers and the rural poor. We discuss concepts and evidence surrounding participation, terms of sale received, costs of participation and their broader impacts on production systems and interactions with the rural non-farm economy. We focus on the links between the reorganization of food systems and smallholder agriculture, while drawing on the work of others who have emphasized the importance of smallholder agriculture for rural poverty reduction. In an economy where there are market failures, household consumption and production decisions are not separable (Singh et al, 1986), and the transformation of food systems affects both production and consumption.

**Why the small farm focus?**

As of 2007, the world’s population shifted from one that was mostly rural to one that is mostly urban, but for developing countries the majority of the population is still rural. Since poverty rates in rural areas exceed those in urban areas, most of the world’s poor are still found in rural areas (World Bank, 2008). Although most rural households have diversified income sources, the majority of rural poor earn their income in agriculture (Davis et al, 2007). Even though farming households are highly diversified with respect to income sources, agricultural production and marketing remain important determinants of household welfare, especially those with lower incomes. Among farming households, smallholders are more likely to be poor than those with larger land holdings (Davis et al, 2007). Smallholder farmers, thus, comprise a substantial part of the rural poor demographic and are therefore a logical entry point for an analysis of how the reorganization of food systems affects rural poverty.

Furthermore, smallholders form the ‘structural backbone’ of the rural economy because of their linkages with small-scale input and service providers, traders, backyard processors and hired labourers (Ashley and Maxwell, 2001). Smallholder productivity and income gains are translated into demand for labour-
intensive consumption goods produced in rural areas and also into investment in non-farm rural activities, thus creating multiplier effects in rural economies. Smallholders are also of interest because, in many instances, they are known to use land more productively than farmers with larger landholdings (Berry and Cline, 1979; Helfand and Levine, 2004). The inverse productivity relationship underscores the importance of pursuing growth in the smallholder sector, since gains can be shared broadly. Furthermore, it is posited that the transformation of food systems creates new opportunities for smallholders arising from aspects of production that are not scale sensitive. For instance, labour market imperfections, which result in a low opportunity cost of household labour, allow for cost-effective supervision of production systems (Heltberg, 1998).

Despite the strong linkages between the small farm sector and rural poverty, it is important to understand the distinction between farms and farming households. Rural households show a high degree of diversification in their activities, with income from agriculture and livestock supplemented by farm and non-farm wages, remittances and income from small enterprises. The vast majority of rural households in developing countries have some form of participation in agriculture. Despite diversification, farm income is the backbone of the income structure of poorer households (Anriquez and Stamoulis, 2007). A broad look at the changing structure of food systems, and rural economies must incorporate the different modalities by which households can be affected by a changing rural economy. Farming is but one entry point, albeit a very important one. To date, there has been little broad-based analytical work addressing the changing income patterns of rural households and composition of rural economies. The analysis shows that expansion of modern forms of retail organization has wider impacts in rural economies, on both farm and non-farm activities (Reardon et al, 2007).

Transformation of production systems
As retail becomes more organized, wholesale more specialized, and procurement more formalized, the management and composition of production systems is being transformed. As a general rule, production systems are becoming more commercialized in developing countries. Commercialized systems are characterized by specialization at the farm level, greater dependence on purchased inputs and more marketing of outputs (Pingali, 1997). Typically, commercialized systems use more labour and inputs per unit of land than subsistence systems. Input use remains low in production systems that are not closely linked with markets (Heisey and Mwangi, 1998; Omiti et al, this volume; Tobgay and McCullough, this volume). As urban centres demand higher value products, and as market structures respond to urban demand, we observe diversification of cropping systems at the meso- and macro-levels, even as they become more specialized at the farm level to take advantage of economies of scale. In Bhutan, areas closer to road points exhibit more market-oriented specialization of their cropping systems and a greater likelihood of participating in output markets (Tobgay and McCullough, this volume).
Particularly in areas where land holdings are small and arable land is limited, smallholders begin to specialize in higher value enterprises, such as horticulture and livestock, as opposed to lower value cereals. At the meso-level, diversification into higher value cropping systems is limited by agroclimatic potential, water resource development and the strength of market linkages. At the farm level, assets, technical know-how and labour availability can limit diversification into higher value crops. In agroclimatically less favoured areas, there are fewer opportunities to produce higher value products for modern chains. Extensive livestock production offers some potential, as does production of lower value, non-perishable raw materials for processing. Biofuels markets could provide high return opportunities in some places where other options are not available. Farmers in less favoured areas are more likely to be competitive in diversified and mixed-livestock systems (Cassman, 1999). Without specific R&D efforts targeting less favoured areas, however, prospects will remain limited. Major constraints include lack of irrigation, pests, poor soil structures and nutrient limitations. Interventions to alleviate these constraints may focus on breeding and variety development, improving best practices for field management and capacity building with technology transfer.

In many agricultural economies at the low end of the development process, agricultural inputs are expensive relative to global prices and, as a result, underutilized. Costliness of inputs arises partly from underdevelopment of infrastructure and underinvestment in institutions (Jayne, this volume). When input prices are too high relative to farm gate output prices, it simply does not make sense for farmers to purchase modern inputs. Furthermore, input providers are not well regulated, and many farmers bear the costs of dubious quality seeds, fertilizer and other agrochemicals (e.g. Crawford et al, 2003; Omiti, this volume; Tobgay and McCullough, this volume). Increasing input use is only profitable to the extent that productivity gains offset the costs of inputs. In many Asian and Latin American countries, input subsidy programmes played a historic role in raising crop yields (Falcon et al, 1983). Most of these programmes were phased out as economies were liberalized, with government agencies now participating less directly in input provision. Similarly, government programmes for agricultural credit, extension, marketing and germplasm development have been scaled back across the developing world as governments have come into compliance with international trade agreements and unsustainable budget imbalances (Jayne, this volume).

The void in agricultural support services has been at least partly filled by the private sector. Input manufacturers and retailers have long played a part in providing agricultural extension. But now buyers are playing a more prominent role in the provision of agricultural services. This includes fertilizer and chemicals, technical assistance and the provision of seeds. Because of their scale, modern buyers can leverage government programmes to subsidize extension or irrigation investments, for instance, receiving bulk payments in exchange for administering services and/or subsidies to farmers. By providing inputs and services free or at below retail prices, buyers can improve their control over production processes while producers improve their access to services.
Upstream from producers, there has been global consolidation in manufacturing of and R&D for key agricultural inputs (Kimle and Hayenga, 1993). This reinforces the hourglass structure, in which a growing number of producers find themselves sandwiched between large, multinational firms who control input manufacturing on one side, and processing and retail on the other (Pingali et al, 2007). Consolidation in input manufacturing is a result of the considerable economies of scale involved on the R&D side. The example of consolidation that took place in the seed industry is telling. Crop by crop, as the industry has advanced from the pre-industrial to the mature stage, private firms replace state agencies in dominating key germplasm R&D activities. The private sector invests more and more in R&D where intellectual property laws are more secure. Even in mature seed sectors, though, the state’s role remains important in regulating the sector and providing complementary public goods (see Morris et al, 1998). The same consolidation is taking place with respect to other agricultural inputs, and the state’s role in regulating the input manufacturing sector is underscored. Another role of the state is to facilitate R&D for agriculture in less favoured areas, which can bring high returns but may nevertheless be ignored by the private sector (Fan and Chan-Kang, 2004).

**Formalizing terms of sale**

The ability of smallholders to sustain participation in organized chains depends on how the terms of sale and cost of participation for the modern chain compare with those for traditional alternatives. Expected returns are impacted by prices and their stability, cost of transporting goods, rates of rejection and timing of payment. Terms of sale relate to the price used for a transaction, but also when, where and how the transaction takes place. They dictate what product changes hands, what standards it must meet and how testing will be conducted.

Terms may depend entirely on the bargaining skills of the parties involved; they may be governed by the regulations of a marketplace; or they may be agreed upon in advance and specified in a written contract. As food systems transform from traditional to structured to modern, there is a shift from the former to the latter. Terms of sale matter because they determine how incentives, risk and marketing costs are distributed between the buyer and the seller. While price and quantity sold can be tracked rather easily, costs (particularly transaction costs) are more difficult to measure and differ greatly between farmers and contexts. Differences in negotiation skills, experience and affiliations can lead to differences in terms of sale (Pingali et al, 2007).

Modern procurement systems may offer participants higher prices, but they also introduce new risks and costs. With fewer and more powerful buyers, farmers have reduced power for negotiation (Gibbon, 2003; Timmer, this volume). Some farmers reported that modern chains offered lower prices but more stability. Others perceived them as offering higher prices but being more risky due to a lack of transparency in quality assessment or price setting. In many transactions, the party that bore more risk (i.e. through price variability) also garnered incentives for doing so (i.e. a higher share of marketing margins). In Bhutan, for example,
citrus exports to India constitute one of the more modern chains. The model relies on intermediaries, who receive advance finance from exporters, to procure oranges from smallholders (Tobgay and McCullough, this volume). As soon as citrus trees blossom, collectors provide advance credit to their producers in exchange for assured access to their orange harvests at a fixed price, determined by the blossoms. The collector oversees the harvest, transport and marketing of the products and bears all associated risks. In the absence of such arrangements, smallholders would probably be deterred altogether from citrus marketing by the labour costs of harvest and the risk of product spoilage due to poor road and market infrastructure.

In general, perceptions of fairness regarding terms of sale have a lot to do with prevailing conditions in surrounding markets. True impacts can only be evaluated after multiple years of repeated participation in a chain, but judgements are often made much sooner. In general, modern chains stabilize inter-annual risk related to price and market instability while introducing new risks related to higher costs of participation and more exacting requirements. Problems arose when risks were delinked from rewards. Sellers, in particular, who bore more risk with less reward, felt they had received asymmetric terms of sale. The perception of unfairness in terms of sale most commonly arose from buyers’ quality assessment, requirements for chain-specific investments and misconceptions between buyers and sellers that led to side-selling.

For instance, when a farmer becomes party to a contract with a fixed price, he or she bears the risk of a price increase while the buyer bears the risk of a price decrease. With a floating market price, both parties share all price risk when information is symmetric. The specific way in which quality standards are enforced also affects the distribution of risks and rewards. An agreement may be designed to penalize a seller for failing to meet standards, either with a price cut or outright rejection. If quality assessment takes place at the point of sale, and the seller assumes transport costs, the seller bears a disproportionate risk from crop rejection. In India, contracts drafted by McCain and Frito Lay for potato growers allowed buyers to reject produce for any reason, despite the fact that producers were obligated to pay for transportation costs to the drop-off facility (Singh, this volume). Producers felt this placed too much risk on them and complained that the quality inspection process was not fair or transparent. Similarly, in Kazakhstan, cotton farmers complained that the buyers, who also performed quality assessment, had incentives to underestimate quality so they could pay lower prices (Swinnen, 2005).

When suppliers provide inputs and a fixed price, they may then offer a price that is lower than the average market price. From their own perspective, in this model, buyers bear a price risk and a default risk. Sellers, particularly those without a good relationship with the buyer, may not understand the logic behind price setting, and, on seeing a better price elsewhere, may choose to side-sell into a different channel. In Kenya, many dairy farmers were bound to sell to their cooperatives in return for the technical assistance they received. They often sold at least a portion of their milk production outside the cooperative, though, to illegal
hawkers, who offered higher prices (Omiti et al., this volume). Unfairness in terms, or perceptions of unfairness, arise from a lack of transparency in the process of formulating and enforcing terms of sale. Interventions should be targeted towards improving understanding while opening channels for conflict resolution. Collectivizing farmers’ bargaining holds the promise of improving terms of sale from the smallholder perspective. Tools for doing this are explored below, along with their costs of implementation.

**Contracts**

Contract farming is a mechanism for vertical coordination that is growing in popularity in modern chains. Contracts usually involve advance agreement between producers and purchasers on some or all of four parameters: price, quality, quantity (or acreage) and time of delivery (Singh, 2002). Specific contract terms and arrangements determine how the parties involved share the benefits, costs and risks of coordination. These may deal with timing of payment; mechanisms for setting price; provision of services and inputs; documentation requirements; quality and quantity produced; arrangements for assessing quality; and mechanisms for settling disputes and enforcing agreements. When contracts fix output prices in advance, they may allow farmers to produce risky high-value, perishable crops that they otherwise would avoid because they are prone to a price glut. These arrangements can also help to ensure a reliable supply for companies that have made sub-sector specific investments (Simmons et al., 2005).

In labour markets, farm owners and wage labourers choose to enter fixed labour contracts because of shortcomings in labour markets. The shortcomings arise from seasonal risk in the demand and supply of labour (Bardhan, 1983) and from difficulties in monitoring casual labourers in tasks like irrigation and input application (Eswaran and Kotwal, 1985). Similarly, buyers and sellers may choose to enter fixed marketing contracts in order to overcome risk and uncertainty in spot markets. These risks of spot markets are similar to those of casual wage labour markets, arising from seasonal variability in supply and demand (resulting risk of shortage and surplus) and from the need to assure quality in the absence of perfect monitoring.

From the buyer’s perspective, the cost of procuring via contracts includes transaction costs arising from the design and implementation of a contracting system (Pingali et al., 2007). Managerial costs, along with capital investments in facilities, are involved. Retailers and processors who procure through contracts must also plan for the costs of abiding by contract terms, which may involve providing inputs at fixed or below-market cost, providing technical assistance and providing credit. More costs result from carrying out transactions and enforcing contracts, including testing product quality and safety, and arbitration where necessary. Many of these costs have fixed, per farmer components, which buyers can cut by targeting larger producers.

As with terms of sale in a non-contract transaction, specific contract terms will determine the extent to which small farmers can share in the benefits from vertical coordination because they allocate risks between interested parties, such
as price and market risk, crop failure risk and the risk that a contractual party defects. Important contract terms include timing of payment; mechanisms for setting price; provision of services and inputs to suppliers; demands on documentation, timing, quality and quantity; arrangements for assessing quality; and mechanisms for settling contract disputes and enforcing agreements. A favourable legal and institutional environment helps contracts to be fairer for small farmers. The Model APMC Act in India, for example, requires contracts to be registered with a local authority and includes provisions on contracts, liabilities, asset indemnity and dispute resolution (Singh, this volume). Direct contract relationships between producers and corporations proved to be more beneficial for small farmers in Punjab than state-sponsored contracts. They resulted in better delivery of extension services and more reliable purchase of commodities (Kumar, 2005).

Contracts can help smallholder farmers access key inputs and services that may otherwise constrain production. The contract itself gives buyers some assurance that they will capture the benefit stream from investing resources in producers. Buyers often provide inputs to farmers with whom they are contracting at below-market prices or at cost, or they may provide technical support and extension services, often of better quality than publicly provided extension services (e.g. Kumar, 2005). Contracts can also facilitate access to credit. In Kazakhstan, credit was the primary reason that smallholder cotton farmers entered contractual arrangements (Swinnen, 2005). In Lithuania, the only source of credit for small dairy farmers was through buyers procuring with contracts. Dairy purchasers in Poland offered credit along with extension services and inputs, and farmer participation was very high in return (Dries and Swinnen, this volume). Supermarkets have offered similar provisions to small farmers, via contracts, throughout eastern Europe and central America. Farm assistance programmes created for contract farmers have been replicated by other companies and by state agencies because of their success (Swinnen, 2005).

Farmers have probably benefited from contractual arrangements in a number of instances, but it is difficult to attribute benefits to participation in the contract itself as opposed to participation in the chain. Benefits arising from contract farming often spill over to participants’ non-contract fields and to neighbouring farmers. In central and eastern Europe and the former Soviet Union, contract farmers enjoyed higher productivity with lower risk on their non-contract crops (Swinnen, 2005).

However, there is also abundant evidence that smallholder farmers are excluded from entering formal contracting arrangements. In India, the contract farming system favours larger farmers at the expense of small producers, very few of whom are participating in contract farming (Kumar, 2005; Singh, this volume). In central and eastern Europe, it is more common for farming corporations to enter contractual agreements than it is for small farmers (Swinnen, 2005). Although contract farming has risen to the point of including 9 per cent of farmers in Suphan Buri, Thailand, very small farmers are much less likely to enter contracts (Dawe, 2005). They are also less likely to receive favourable terms, such as a fixed output price, and therefore bear more risk.
Farmer organizations

One possible method for small farmers to overcome some of their size disadvantages is to form production and/or marketing groups. By joining together in the name of common production and marketing interests, small farmers can increase their effective size and bargain for more favourable terms. Cooperation can increase bargaining power, allow for economies of scale, and lower marketing and negotiation costs by pooling negotiation efforts. Cooperative marketing can ease supply constraints faced by individual farmers, allowing them to meet buyers’ orders year-round, where production systems permit. Internal incentives can be provided for farmers who fill off-peak orders. When agricultural systems are dominated by smallholders, farmer organizations have been designed in order to supply large buyers who have no other options for procurement. In India, Mahagrapes successfully arose as an export-oriented umbrella marketing organization for several cooperatives of smallholder grape producers (Narrod et al, this volume).

When buyers require investments, farmer organizations may offer a cost-effective way of upgrading through pooling of investments. By organizing, smallholders can access information and share knowledge more easily, decreasing their search and information costs. There is a strong tradition of farm cooperatives in the Netherlands, which have served as a farmer safety net and helped to raise productivity. Now Dutch cooperatives are assuming many more roles, including innovation and direct involvement with consumers (Bijman and Hendrikse, 2003).

Farmer organizations are not a panacea, as they can be very costly to set up and maintain. Efforts to design and start an organization in one place are not necessarily replicable because management structures are so contextualized. Group decision-making can be costly, and, in some cases, the success of organizations is unduly dependent on the charisma, intelligence and altruism of one leader. An informal survey of supermarket procurement officers worldwide suggested that retailers have negative associations with procurement from farmer groups, stating that they can be difficult to work with, unreliable and inexperienced (Reardon and Hopkins, 2006).

Lowering marketing costs: other strategies

Beyond the widely discussed cooperative, there are other models for achieving economies of scale through coordination between farmers. Large farmers, for instance, can serve as intermediaries between smallholders and supermarkets by subcontracting for some of their production needs (e.g. in Honduras) (Lundy et al, 2006; Meijer et al, this volume). Different forms of tenant farming (e.g. exchange of labour for a portion of harvest) and reverse tenancy (e.g. leasing of land management to a larger operator in exchange for rent) have long been in practice to solve various inefficiencies in factor markets, particularly for land, labour and capital.

Geographic clustering by product has been put forward as a way to economize on sub-sector specific investments in production and post-harvest
infrastructure. This strategy may offer some promise, but picking sub-sectors that will retain price stability is notoriously difficult. Mistakes have been made in the past, with farmers suffering the effects of price glut due to overproduction while struggling to repay debt on specific assets (Shepherd, 2007).

Costs of participation
Modern chains often dictate production methods and may or may not facilitate support for production systems via technical assistance and input provision. Production costs are likely to be higher in modern chains, which are more demanding than traditional chains. Evaluation of explicit costs and returns, and less explicit transaction costs associated with maintaining and enforcing agreements, will dictate smallholders’ competitiveness in and preferences for different chains. Because the same characteristics that allow a farmer to supply a high-value market will also influence the farmer’s income regardless of market, higher incomes observed in a chain can result from either the chain’s characteristics or the farmer’s, or some combination of the two (Sadoulet and De Janvry, 1995). Sustained participation over time is a good indication that a chain is profitable for participants compared to other options. If farmers are required to make specific investments, though, especially in specialized assets and equipment with low resale value and convertibility, ex post continued participation might reflect investment irreversibility and sunk costs rather than satisfaction. Farmers who make specific investments in order to participate in a chain must bear the risk of the buyer defaulting (Gow and Swinnen, 1998). It is important to have watchdog organizations or institutions accessible so that they can voice their complaints and pursue arbitration when they feel they are being exploited.

Apart from the ability to specialize in specific crops, farmers selling into modern chains must be able to meet their more exacting quality and safety requirements. Complying with private and public standards has implications for on-farm production systems. It may require investments in capital equipment, such as post-harvest storage facilities, or a system for preventing contamination of fields with household waste water (Narrod et al, this volume). In Kenya, smallholders who were supplying fresh green bean export chains switched to chains for processed beans once stringent quality and safety standards were introduced into the fresh green bean chain (Narrod et al, this volume). It is very difficult to meet high quality standards for horticultural crops without an irrigation system, which allows for efficient application of inputs (Rosegrant et al, 2002). In the heavily groundwater-dependent Indian state of Gujarat, McCain informally required its potato suppliers to use efficient irrigation systems, citing concern about sustainability of water use as the reason (Singh, this volume).

In order to encourage better quality, modern buyers urge their suppliers to adopt specific management practices regarding varieties used, planting, fertilizer and pest management, and harvest. This was observed in virtually all case studies. Retailers have been known to request their suppliers to adopt integrated pest management to reduce the prevalence of pesticide residues in final products. To encourage uniformity of produce, processing firms may dictate specific
dimensions for seed bed height and width and planting date (e.g. Singh, this volume). In general, modern chains will be more closely linked with consumer demands (or processor requirements) since they will have in place mechanisms to transmit information and incentive systems upstream to reward compliance. In countries where quality requirements for traditional domestic systems differ greatly from those in developed countries, production practices can differ drastically between fields with crops produced for export and with the same crops produced for the domestic market (e.g. Narrod et al, this volume).

**Smallholder participation is limited**

Ultimately, not all farmers have the option of supplying all markets. From the options available to them, farmers will choose the ones that bring the most expected returns to the household. It is rather easy to observe whether or not smallholder farmers are participating in a given marketing chain. But non-participation is not the same as exclusion, since it can also arise from a farmer’s decision not to participate because a different option is preferred. Distinguishing between these two types of non-participating farm households can be difficult without targeted surveys at the household level, but confusing them can lead one to erroneous conclusions. There is evidence from all areas of the world of smallholders participating in many different types of modern chains, both domestic and for export, with contracts or without, as part of producer organizations or independently. However, it is very difficult to assess the extent of participation because most studies adopt a case study approach, tracing a particular retailer or producer group, or targeting a location because participation is known to take place there.

This case-based approach is necessary for identifying and assessing emerging trends, but it is not good for estimating their extent. Evidence from central and eastern Europe suggests that smallholder inclusion is robust in areas where most landholdings are uniformly small (Swinnen, 2002). Where smallholders are part of a dualistic system with the presence of large landholders, modern buyers show a preference for procuring from large farmers. Evidence from Latin America and Africa supports this hypothesis (Berdegue et al, 2005; Reardon et al, this volume). Modern buyers have been known to develop mechanisms for procuring from smallholders because there is no one else to procure from (Narrod et al, this volume) or for public relations purposes. It is difficult to know the extent to which public relations incentives have motivated smallholder inclusion, but such incentives are likely to be limited in nature and short-lived.

Scale mismatch is perhaps the most common constraint to smallholder participation in modern chains. Individual smallholders have limited ability to negotiate and bargain for beneficial price and non-price terms from major retailers and processors on the output side and major multinational manufacturers on the input side (Vorley, 2003; Pingali et al, 2007). Smallholder farmers can be excluded from preferred supplier lists or contract-based marketing channels because buyers specify a minimum cut-off acreage or product volume that exceeds their capacity, given finite land holdings. It is much more likely, though, that smallholders will be excluded de facto because of fixed costs involved with
participating in modern chains. Buyers may require specific on-farm investments in assets (e.g. irrigation systems) that are not profitable for small-scale producers. In Honduras, for example, Hortifruti’s regional specialized wholesale arm required farmers to pay for their own costs of supervision. The costs started at US$1,000 per year in each farmer’s first year but were reduced to $500 in subsequent years (Meijer et al, this volume). In the Shandong province of China, farm size and household assets had little effect on which marketing channel apple and grape farmers took part in, but strict quality and safety standards were not present (Huang et al, this volume).

Another key barrier to smallholder participation in modern, high-value marketing opportunities arises from business orientation. Identifying, solidifying and exploiting opportunities to sell to modern buyers requires a certain entrepreneurial quality. Some farmers have fewer opportunities to develop their managerial human capital (Bingen et al, 2003). Because transaction costs associated with joining modern chains are likely to be large at the start and decline with time and experience, policies directed at lowering initial barriers to entry for farmers who are otherwise competitive are likely to be effective at facilitating the inclusion of smallholder farmers. Interventions aimed at reducing uncertainty surrounding new outlets and improving advocacy tools available to small farmers are likely to reduce one-time transaction costs associated with entering modern chains. Negotiation costs can be reduced with capacity building and legal assistance with forming agreements. Search and information costs can be alleviated with the expansion of market information systems that make marketing outlets and their terms more explicitly known and allow farmers to compare different outlets (Pingali et al, 2007).

Empirically, it is difficult to distinguish between buyer exclusion and farmer self-exclusion because the observed outcome (non-participation) looks the same. If modern chains involve higher costs but bring higher returns, and smallholder farmers are resource constrained, buyer exclusion is probably a more common cause of non-participation than self-exclusion. Several examples uncovered in this research suggest instances where smallholders were capable of participating in modern chains but chose not to. In India, for instance, farmers who were selling potatoes under contract to modern processors chose only to sell about 50 per cent of their output to the processor. They were qualified to be preferred suppliers, but in order to hedge the risks of full participation, they only committed a portion of their land holdings to the contract (Singh, this volume). With time, the costs associated with introducing formal coordination into transactions should fall as transactions are repeated between the same parties, who acquire experience and build trust in the process (Rademakers, 2000).

It is important to note that even farmers who sell into modern chains also sell into traditional (or structured) wholesale markets at some point, even for the same crops that are being sold to modern buyers (McCullough and Pingali, this volume). Improving the performance of traditional markets benefits everyone, as alternative procurers must compete with the traditional system. The issue of smallholder participation in modern chains has limited poverty reduction
implications for farmers who are not already participating in markets. It is important to note that, for many smallholders, participation in even traditional markets remains a more pressing concern. Household surveys conducted across eastern and southern Africa suggest that the majority of rural households do not sell any grain but buy it regularly (Jayne, this volume). For many of these households, the most important source of ‘income’ is household production that is consumed at home. By improving productivity and reducing marketing costs, households can divert more labour to cash-earning activities.

**Interactions between the transformation of food systems and the rural non-farm economy**

With income growth, increased opportunities are available for off-farm employment, and more pressure is placed on labour markets, resulting in rising wage rates which also affect seasonal agricultural labourers. The diversification of production systems out of staple crops and into higher value products is another characteristic associated with the transformation of food systems. Higher value crops, such as horticulture and livestock, often require more labour input. High-value exports from Senegal had a poverty reduction effect through labour markets rather than smallholder participation (Maertens and Swinnen, 2006). Households’ willingness and ability to grow higher value crops is impacted by the availability of labour within the household and the predominant wage rates for hiring-in labour. In the Shandong province of China, greater household participation in off-farm income-earning activities was associated with lower participation in fruit production. Fruit production and off-farm employment were seen as competing demands for the time of household members. Those who were involved in off-farm employment faced higher opportunity costs on their time and were less likely to turn to apple and grape farming (Huang et al, this volume). Some evidence suggests that off-farm income is correlated with agricultural input use, which is consistent with the hypothesis that it eases credit constraints (Davis et al, 2007).

As food systems transform, so will the non-agricultural prospects of smallholder households. Households may choose to pursue off-farm work in agricultural processing, other manufacturing, agricultural labour markets or through migration to other places. Little is known about the impacts of changing food systems on the broader rural economy (Reardon et al, 2007). Impacts will arise from subsidiaries of supermarkets moving into small towns and rural areas to sell food and other consumer items, thus knocking out local small-scale retailers and businesses. Since smallholder agriculture constitutes the backbone of the rural economy, marginalization of smallholders will probably have net labour effects in rural areas (Anriquez and Stamoulis, 2007). It is natural for populations to move from farms to cities as an economy grows and the relative importance of the agricultural sector falls. But agriculture is important for supporting households until better opportunities emerge in other sectors, preventing premature exit. Many African countries have much higher urbanization rates than they
would if agriculture was more productive (Jayne, this volume). Managing the ‘push’ out of agriculture would help alleviate social problems arising from growth rates of urban areas. For those without prospects for migrating or working in other sectors, agriculture is the only hope.

Way forward

Because of organizational changes in food systems, smallholders now face many new opportunities to benefit from rapidly growing market segments. Modern chains are capable of lowering the risks of participating in higher value markets while transmitting rewards for meeting quality and safety standards. Because of the high costs of participating in these marketing chains, smallholders risk being excluded from a lucrative market segment. In many transforming economies with modernizing food systems, modern chains account for a substantial share of food retail. In these countries, if retailers are unable to procure through traditional channels, they will form a separate, vertically coordinated procurement system that competes with the traditional system. This can be observed in many countries in Latin America. In this case, the risk to smallholders is that, unless they can link into the modern procurement system, they will be relegated to a low-value, shrinking market segment. Throughout Asia, traditional markets have continued to supply the modern retail sector, which itself has captured a limited share of food retail. While rising food safety concerns among Asian consumers could threaten ties between traditional wholesalers and modern retailers, for now Asia’s smallholders appear to be well linked in with domestic urban markets. In most of Africa, however, modern retail is not expected to capture a substantial share of food retail over the next decade. Furthermore, lucrative opportunities to link with high-value export markets are quite limited in scope. The real danger is that smallholders in remote areas are excluded from agricultural marketing altogether due to high transportation and transaction costs and the widespread availability of cheap imports.

The transformation of food systems presents a set of problems that vary drastically between countries, based on characteristics of the food system, the place or the households involved. Different countries will prioritize problems differently depending on the context. There is no one policy response, but a common objective between all situations is to see smallholders through the transition, in recognition of their importance for rural poverty. Facilitating the transformation ultimately boils down to a three-pronged policy approach:

1. facilitating the inclusion of smallholders in modern chains by reducing costs of participation;
2. upgrading traditional marketing systems;
3. supporting those who cannot supply traditional markets with social safety nets.
Policy responses

We explore in greater depth what each initiative entails and outline a role for governments, the private sector and civil society to play in facilitating the transformation for smallholder farmers (Table 1.3). In general, identifying and pursuing appropriate policy responses to the transformation of food systems presents several challenges. The transformation of food systems is an unwieldy

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Table 1.3 Policy tools in traditional, modernizing and industrial food systems
phenomenon, often spilling out of the traditional policy space of Ministries of Agriculture. Responses at different phases of the food chain must be coordinated, and it is not always clear which institutions and ministries can and should take the lead role. Responding to the transformation of food systems does not require drastic reforms. Relatively minor adjustments, beginning with removing market distortions and maligned incentives, can be very effective. However, developing country institutions are rarely of the cross-cutting nature needed to face such problems. While specific policy interventions should be addressed at the right scale, political boundaries and political capital do not always correspond with the scales at which market interventions are needed (i.e. market-shed, watershed, etc.).

Most of the policy interventions described below are relevant for governments in developing countries that are going through the agricultural transformation process. While appropriate government policies are absolutely necessary for managing the transformation of food systems, there are nevertheless roles to be played by the private sector and civil society organizations. Multinational corporations who are building procurement programmes in developing countries should be discouraged from pursuing monopsonistic procurement conditions through anti-competitive behaviour. When procurement practices are open and transparent, it is easier to monitor and regulate them. Private companies in retail and processing cannot be expected to save smallholder farmers while serving their business interests. Therefore, creative institutional innovations are welcome to align the interests of smallholders with those of the modern retailers and processors who are controlling a growing share of food retail.

Non-governmental organizations (NGOs) can play a key role in supporting smallholders through the transformation when government policies fall short. They can help link smallholders with modern chains by lowering the one-time, initial barriers to entry. NGOs can do this by building capacity, providing information and experience, and financing investments in assets. Furthermore, NGOs can monitor vulnerable groups who risk marginalization by the transformation process. They can flag problems and mobilize political capital for addressing problems. NGOs and socially oriented businesses have been involved in developing markets, through certification programmes and direct trade, in building niche markets for products whose supply chains are socially responsible, which have benefited the participants although the scope is still limited.

Governments in developed countries bear the responsibility of promoting a balanced system of global trade. In many developed countries, domestic support systems for agriculture have been widely criticized because they are linked with price distortion and commodity dumping. A new form of protectionism is arising in some developed countries, with retailers being urged to label the ‘food miles’, or physical distance travelled by all products on their shelves. Improving consumer access to information about the energy footprint of the products available to them is essential, but food miles labelling isolates only one stage in the supply chain, the transport stage, rather than the entire chain. Products that are produced by smallholders in developing countries are likely to travel a longer distance to get to
retailers’ shelves, but their carbon footprints may nevertheless be lower than those of locally produced alternatives due to differences in production technology.

**Facilitating the inclusion of smallholders in modern chains**

At the country level, opportunities for linking smallholders into modern chains are determined by the size of the domestic market, which is set by urbanization rates, the average income and the prevalence of a middle class. Potential for trade is set by macroeconomic conditions and trade policies. Overall governance influences the cost of doing business (which has a large impact on transaction costs), and the institutional setting (which affects the climate in which agricultural activities occur). In countries with a strong urban demand, good institutions supporting financial services and R&D, and good governance, it is less of a battle to link smallholders with consumers through organized chains.

Most modern chains involve higher costs of production along with fixed investments. Households with asset constraints may not be able to overcome initial hurdles associated with entering a chain. Off-farm sources of income and household ownership of fixed assets most probably improve the household’s ability to access finance and invest in productive activities. Investments in rural education and improving rural public health systems can help alleviate constraints that commonly afflict smallholder farming households (Schultz, 1988). Capacity will influence a household’s willingness to pursue and ability to meet the requirements posed by modern chains. It will also affect a household’s ability to access credit and reduce the burden of many transaction costs specific to modern chains (Barrett et al, 2001). Capacity, in turn, is built through education and experience, among other factors.

Inclusion/exclusion happens at the farm–market interface. As long as there are entities or intermediaries that can buffer the scale-specific needs of buyers against the capabilities of the small-scale producer, and cover their costs by adding value, then there is no reason why smallholders should be excluded in a world where organized retail is expanding rapidly. However, because different strategies for bridging the scale mismatch are associated with different types of transaction costs, the appropriate model depends on the context.

Organization and cooperation seem to be natural responses to reducing transaction costs arising from the scale mismatch between individual farmers and those procuring from them. Local organizations are essential for the scaling up function, linking small-scale producers with larger scale buyers. Without some local initiative, it is highly improbable that individual households can tap into modern chains. A critical threshold must be crossed, either by local producers who band together and pursue market opportunities, or by a buyer coming to a place with the purpose of procuring a product. As governments across the world are diminishing their institutional support for agriculture, local organizations are stepping in to fill the void. Organizations have tackled the challenges of marketing produce, adding value through processing, input provision, financial services and
market information, and vocalizing key elements of the policy agenda. There has been no magic formula for developing these organizations or ensuring their effectiveness. But local capacity gives rise to leadership and transparency seems to promote perceptions of fairness, thus keeping members and clients satisfied (Shepherd, 2007).

In evaluating different strategies to link smallholders with markets, it is important to consider the cost of implementing them against the benefits, along with the distribution of costs and benefits between households. It would be hard to justify, by any reasonable cost-effective criteria, many supply chain development projects that have been carried out to promote smallholder participation in modern chains (Shepherd, 2007; Meijer et al, this volume).

In general, interventions to facilitate smallholder participation in modern chains should not be heavy-handed. A top priority is creating an enabling environment through the provision of public goods that reduce transaction costs. There are many ways to lower the costs of doing business with smallholders. Governments can leverage incentives for including smallholders without being directly involved. In India, the state government of Punjab provided incentives for contracting with farmers that included reimbursement of extension costs. Such incentives could, instead, be specifically targeted towards those who contract with smallholders, in order to negate the higher per-farmer transaction costs that the procuring company incurs by contracting with smallholders. Information asymmetry costs can be reduced with improved marketing extension and capacity building and market information systems. Improving market and transportation infrastructure, as well as transportation services, will reduce the transaction costs associated with negotiation as marketing costs are lowered and more marketing channels become available. Finally, improving the legal and institutional environment surrounding contract formulation and arbitration will reduce smallholders’ costs of entering into more formal agreements by making them more available.

Public investments in specific chains and projects should be carefully considered. Picking ‘winners’ is problematic. Public investments should be weighed against the benefits they generate and how those benefits are distributed. Well-placed public chain investments can be catalytic. However, chain-specific investments to link smallholders into modern chains are likely to be costly in terms of the number of farmers reached and the income effect on each farmer. Such targeted investments benefit participants, but there are almost always few participants relative to non-participants, and there is a threat of further alienating non-participants. Governments will do best by supporting a competitive, investment-friendly environment that is also well regulated and by allowing the market to pick the winners while leveraging maximum social benefit from private investments in modern chains.

**Upgrading the traditional system**

While benefits from investments in modern supply chains for specific sub-sectors are largely held by participants, investments in traditional wholesale markets are
shared more equitably. Well functioning traditional markets facilitate procurement for modern retailers and processors who can avoid investing in alternate infrastructure to bypass the traditional system if it serves their needs. When retailer bypassing becomes widespread, incentives for upgrading traditional markets with public resources are reduced. Key advocates for upgrading the public system may be appeased if the private system meets their needs, leaving behind the traditional market and widening the gap between modern chains and traditional ones, leading to ‘duality’ in domestic food systems. Improvements in traditional markets also serve traditional processors and retailers, who do not have the option of bypassing traditional wholesale markets. Traditional market improvements even serve farmers who are participating in modern chains because modern buyers must compete with the traditional marketplaces.

Some simple improvements in market structure can improve traceability and public health standards while reducing spoilage rates. Improved flow of information and regulation of market transactions will reduce the transaction costs that arise from information asymmetry and trader corroboration. These interventions must be financed somehow, and they could have an impact on price margins. Traditional markets will never compete with vertically coordinated private chains in product differentiation and information exchange, but strategic investments in market structure could allow traditional markets to achieve a minimum standard that meets the needs of many retailers and processors.

In countries at the low end of the transformation process, the priority is in expanding traditional wholesale markets, improving their structure and forging upstream linkages with producers and downstream linkages with retailers and processors. In modernizing food systems, it is important to improve traceability and reduce spoilage rates in wholesale markets to reduce retailers’ incentives for bypassing. The HACCP (Hazard Analysis and Critical Control Point) system offers some promise for implementing basic safety standards in traditional chains, but its implementation requires widespread education and cooperation throughout the chain (Unnevehr and Jensen, 1999). Opportunities for differentiating products based on quality attributes should be further explored within traditional wholesale markets, particularly in Asia where they still hold a large market share, so that traditional markets can continue to serve organized retailers, street vendors and everything in between. The wider the barriers separating traditional and modern chains, the more difficult and risky it is for a farmer to participate in modern chains relative to alternatives (Narrod et al, this volume). When there is a healthy and domestic retail and/or processing sector, and a wholesale system that accounts for product differentiation, farmers have more options between the opposite extremes of basic traditional commodity markets and high value exports of fresh produce. In China, the vibrant traditional wholesale sector accommodated the full spectrum of quality needs.

Poor infrastructure for transport raises the price of inputs while lowering the price of outputs. Where infrastructure is poor, the input to output price ratio is a key determinant of competitiveness in a given location (Heisey and Mwangi, 1998). Post-harvest infrastructure for storage will improve marketing flexibility
while decreasing the burden of spoilage. When wholesale market infrastructure and collection points are present, farmers have the opportunity to earn higher marketing margins. On the whole, investments in transport and marketing infrastructure will expand the range of consumers that farmers can reach while increasing the prices they can earn, lowering marketing risk while raising incomes.

**Safety nets for non-participants**

For many smallholders throughout the world, and particularly in sub-Saharan Africa, opportunities to participate in modern, organized chains are eclipsed by the more fundamental challenge of participating in any market. Market linkages for smallholders can be improved by lowering transaction costs, investing in market and transport infrastructure, boosting smallholder productivity and improving access to inputs. Supporting smallholder productivity is essential and benefits both non-sellers and sellers. When markets are thin and prices are variable, livestock and cassava can be harvested flexibly, allowing smallholders to manage price risk more effectively (Jayne, this volume). In countries where very few farmers are participating meaningfully in markets, commodity price supports benefit a few ‘elite’ farmers disproportionately (Jayne, this volume).

Many places are simply unsuitable for high-value agriculture because of agro-climatic limitations. Only a narrow range of agroclimatic conditions is suitable for rainfed horticulture, for instance. To an extent, physical factors determine the set of crops that can be grown in any place. However, local investments, for example in water resource development, can expand the set of options available, and the potential for diversification. Targeted investments in R&D for production in less-favoured areas can also help overcome agroclimatic constraints, but in most cases technical expertise must be brought in from other places. Production technology for less favoured areas could become disruptive in the long term, but a lack of foreseeable pay-offs in the short term deters sufficient investment.

Improved infrastructure can possibly alleviate land constraints. In Zambia, for example, land holdings are clustered in higher potential areas, with lower potential and more remote areas being less inhabited (Jayne, this volume). Improving road infrastructure could effectively increase a country’s productive land area. In some instances, smallholders in isolated areas and low input production systems may be competitive in local markets because poor infrastructure raises retail prices. While improving transport infrastructure may reduce some farmers’ ability to market some crops profitability, the benefits of infrastructure expansion are likely to be shared more widely and outweigh the costs. In southern and eastern Africa, there are many more buyers of staple grains than sellers (Jayne, this volume). As needed, mechanisms can be devised to compensate those who are hurt by infrastructure expansion.

Even after improving productivity and market access, many smallholders will remain in production on a subsistence basis or will pursue off-farm income or migrate to towns and cities. Through the process of agricultural transformation, it is normal for the size of the population dependent on agriculture to decrease over
time as agriculture’s share in the economy falls and as per capita incomes rise. When migration out of rural areas occurs faster than growth in opportunities to earn income in rural areas, this migration results in a transfer of poverty rather than true poverty reduction associated with the agricultural transformation (Ravallion et al, 2007). Developing alternative incomes in rural areas is essential for seeing smallholders who have no future in farming through the transition. Social safety nets, such as targeted feeding programmes for chronic hunger victims, are essential for those who have no sources of income and limited prospects.

Notes

1 According to the World Bank’s classifications in the World Development Report, modernizing economies fall into two categories: ‘transforming’ and ‘urbanized’ (World Bank, 2008). Relative to the urbanized economies, transforming ones are marked by a greater share of agriculture in the work force, a lower GDP per capita, lower urbanization rates, higher overall poverty and rural poverty rates. It is not necessarily implied, though, that agricultural economies must pass from agricultural to transforming to urbanized rather than directly from agricultural to urbanized.

2 Originally the European Retailer Produce Working Group Good Agricultural Practices.

3 Monopsony is a market condition characterized by one buyer and many sellers.

References


Chen, K. and Stamoulis, K. (this volume) ‘The changing nature and structure of agri-food systems in developing countries: Beyond the farm gate’


Dirven, M. and Faiguenbaum, S. (this volume) ‘The role of Santiago wholesale markets in supporting small farmers and poor consumers’


‘Conceptual framework’, draft 21 July


Dries, L. and Swinnen, J. (this volume) ‘The impact of globalization and vertical integration in agri-food processing on local suppliers: Evidence from the Polish dairy sector’


FAOSTAT (2006) FAOSTAT, FAO, Rome


Huang, J., Wu, Y. and Rozelle, S. (this volume) ‘Marketing China’s fruit: Are small, poor farmers being excluded from the supply chain?’

Kennedy, E. and Reardon, T. (1994) ‘Shift to non-traditional grains in the diets of east and west Africa: Role of women’s opportunity cost of time in prepared-food consumption’, *Food Policy*, vol 19, no 1, pp45–56


McCullough, E. and Pingali, P. L. (this volume) ‘Overview of case studies assessing impacts of food systems transformation on smallholder farmers’


Meijer, M., Rodriguez, I., Lundy, M. and Hellin, J. (this volume) ‘Supermarkets and small farmers: The case of fresh vegetables in Honduras’


Narrod, C., Roy, D., Avendaño, B. and Okello, J. (this volume) ‘Impact of international food safety standards on smallholders: Evidence from three cases’

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