

CONTRACT FARMING IN DEVELOPING COUNTRIES: THEORY, PRACTICE, AND POLICY IMPLICATIONS

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Introduction

Small farmers¹ in developing regions face a number of constraints that limit their productivity. First, they lack information about production methods and market opportunities, particularly for new crops and varieties. Often farmers are familiar with subsistence crops and perhaps a few widely-grown cash crops, but they have less experience with high-value commodities for which market demand is growing rapidly. Second, even with sufficient information about profitable investments, small farmers often lack the necessary financial reserves to invest in new crops, and their lack of collateral limits their access to credit. This constrains their ability to make profitable investments in tree crops or other crops that have expensive input requirements. Third, farmers operating near subsistence are understandably risk averse. They often prefer to assure themselves of a minimum supply of food before expanding production of cash crops for an uncertain market.

Contract farming has attracted the interest of researchers and policymakers because it has the potential to solve several of these constraints simultaneously. Contract farming may be defined as agricultural production carried out according to a pre-planting agreement in which the farmer commits to producing a given product in a given manner and the buyer commits to purchasing it. Often, the buyer provides the farmer with technical assistance, seeds, fertilizer, and other inputs on credit, and offers a guaranteed price for the output (Eaton and Shepherd 2001). This definition excludes post-planting agreements in which traders merely agree to purchase the harvest. Although more common than pre-planting agreements, this type of arrangement does not involve the provision of inputs, credit, or technical assistance,

1 A *small farmer* is defined as one who relies primarily on family labor with modest or only occasional use of hired labor. In most countries, this definition corresponds to farms of 3–5 hectares or less.

nor can it influence production decisions, so it is less interesting from a development perspective.

Large farmers have better access to credit, better information about production and marketing methods, and greater tolerance of risk. However, these advantages are offset by the higher costs and lower motivation of hired laborers compared to family members. Thus, contract farming can be seen as a way to combine the advantages of large-scale production (improved access to credit, better production methods, and tolerance of risk) with the strengths of small-scale production (lower implicit labor costs and improved incentives).

Although reliable estimates are not available, international trends in agriculture suggest that the prevalence of contract farming may well be increasing in developing countries. The growth of high-value agriculture, the expansion of agricultural processing, the consolidation in the retail food sector, and the increased demand for quality and food safety are all driving the need for vertical coordination in agricultural supply chains (Jaffee 2003; da Silva 2005; Gulati et al. 2006).

However, the impact of contract farming is a subject of debate. Among proponents, contract farming is seen as a solution to the problems of information, credit, and market risk that small farmers face in commercial production. They see contract farming as facilitating the integration of small farmers into commercial agriculture, leading to income growth and poverty reduction. Critics, on the other hand, see contract farming as a way for large firms to take advantage of the land and poverty of small farmers, paying them less than the minimum wage and effectively taking control of their farms. The integration of small farmers into commercial agriculture is seen as a negative trend, leading to higher risk, indebtedness, and income inequality (Little and Watts 1994; Singh 2002).

In light of this controversy, it is worth reviewing the experience of contract farming in developing countries. More specifically, this chapter has four objectives:

- to describe the economic rationale for contract farming as a way to organize agricultural production,
- to examine the conditions under which contract farming is likely to make economic sense and to emerge as a marketing institution,
- to review the empirical experience with contract farming in developing countries, emphasizing its impact on small farmers in African countries south of the Sahara, and

- to identify ways to promote contract farming when they contribute to an efficient and equitable system of agricultural market institutions.

We examine the economics of contract farming, showing that it is one form of vertical coordination that solves the problem of matching supply and demand under certain circumstances. We then describe the conditions under which contract farming is likely to emerge, based on the type of buyer, the type of commodity, and the policy environment. We then review the empirical evidence regarding the impact of contract farming on farmers in developing countries, including both the effect on participating farmers and the likelihood that small farmers will be incorporated into contract farming schemes. Finally, we summarize the findings and identify some policy implications.

Economic Rationale for Contract Farming

All markets require some form of vertical coordination—that is, matching of supply and demand between different participants in the marketing channel, such as farmers, processors, wholesalers, and retailers. If a farmer intends to sell some of their maize harvest, he or she needs to know what kind of maize is in demand, where and when to sell it, and what price it is likely to sell for. Similarly, a large-scale maize miller in the capital city needs to know what kind of maize will be available for purchase, where to buy it, time of harvest, and how much it will cost. This type of vertical coordination problem exists throughout the marketing channel, for example between processors and wholesalers and between wholesalers and retailers, but the focus here is on the relationship between farmers and the buyer of the agricultural output.

Economics of Vertical Coordination

Transaction cost economics explains relations between buyers and sellers in terms of the costs of carrying out transactions, including finding a buyer, negotiating a price, delivering the commodity, and obtaining payment, as well as the risks associated with the transaction, including the risk of being cheated (Grosh 1994. Williamson 2000). Four problems exacerbate the cost of completing a transaction:

- **Imperfect information:** Because of imperfect information, sellers must spend time finding potential buyers and negotiating the price. Often the seller has more information about the quality of the product, but the buyer has better information about the market demand.

- Limited ability to process information: Even if the buyer and seller had all the relevant information, they would not have the time or capacity to analyze it thoroughly.
- Dishonesty: The buyer and seller can never fully trust each other since each has some short-run incentive to misrepresent the truth and violate the terms of their agreement.
- Asset specificity: The risks of opportunistic behavior are even greater when the buyer or seller must invest in assets that are only useful for carrying out a transaction with the other party (Williamson 1983). After farmers invest in a crop (particularly a tree crop), their negotiating position is weakened if there is only one buyer (or just a few) in the area.

Delgado (1999) shows that contracted commodities often have high transaction costs in production and/or marketing. More specifically, these commodities tend to be characterized by labor-intensive production, complex input requirements, perishability, high value–weight ratio, and economies of scale in marketing but not production.

Although transaction costs are often seen as problems for the farmer, they affect traders and processors as well. Buyers cannot trust sellers to describe the quality and quantity of their product and are often forced to physically inspect it before purchase. If a processing plant is designed to handle just one commodity, the processor is locked into the sector by asset specificity and is dependent on a steady supply of the raw material. This problem is probably less severe for buyers than for farmers, however, because there are often many suppliers, making collusion difficult.

Formal and informal economic institutions are designed to address these problems by facilitating communications, disseminating information, developing trust, and punishing dishonest behavior. Examples include repeated transactions with trusted partners, informal codes of conduct, grades and standards, trade associations, credit bureaus, and (when the stakes are high enough) the legal system.

These institutions, however, cannot eliminate all costs and risks associated with carrying out a transaction, particularly in developing countries where the legal system and other institutions are less well developed. As discussed in the next section, transaction costs also help to explain the types of vertical coordination in the markets of different agricultural commodities.

Types of Vertical Coordination in the Agricultural Sector

Often farmers sell in *spot markets*, in which transactions between buyers and sellers do not involve any commitments outside the transaction itself. In this case, coordination of supply and demand with respect to quantity, quality, and timing occurs only through the price. If the commodity is nonperishable, there is less need to coordinate the timing of sales; if the commodity is widely grown, there is no need to coordinate the location of delivery; if the production methods are well known and use few inputs, there is no need for the buyer to provide credit or technical assistance; and if the commodity has only small variations in quality, there is no need to coordinate the supply and demand of quality attributes. Thus, spot markets work well enough (and are the norm) for staple cereals and pulses, as well as fruits, vegetables, and livestock products destined for traditional domestic channels, where consumers are less quality sensitive.

Sometimes, spot markets are not able to achieve the necessary degree of vertical coordination, and an agreement (formal or informal) is needed. *Contract farming* allows a higher level of coordination between farmers and buyers regarding the methods by which the commodity is produced, the timing and location of delivery, and the characteristics of the commodity, such as variety, color, size, moisture content, and so on. Of course, contracts involve costs for both farmers and buyers. The buyer must draft a contract, educate potential farmers about the terms of the contract, sign up participants, monitor compliance with the contract, and develop a strategy for enforcing the contract. The farmer makes a commitment to sell to a buyer at a given price and gives up some autonomy in production decisions. The Section “Conditions under which Contract Farming Makes Sense” (below) discusses the conditions under which the benefits of contracting are likely to exceed the costs.

The tightest form of vertical coordination is *vertical integration*, in which agricultural production and processing are carried out within the same company. Instead of buying raw materials on the open market (spot markets) or negotiating agreements with a group of farmers (contract farming), the company purchases or leases farmland and hires farmworkers to produce the crop. Clearly, the company has more control over how the product is grown and harvested when it owns the land and hires the labor, but farmworkers are paid by the day, so they are less motivated than independent farmers and require closer supervision. In addition, it is more costly to adjust the level of output when the firm produces on its own land (Eaton and Shepherd 2001).

In practice, there are many forms of vertical coordination that do not fit neatly into this three-part classification system. Cooperatives and producer

organizations may play a role in helping to match supply and demand, either as part of a contract-farming scheme or in the context of spot markets (Coulter et al. 1999). Nongovernmental organizations, local government officials, or donor-funded projects sometimes act as intermediaries, trying to link farmers with agricultural processors or exporters by providing technical assistance, establishing standards, and/or providing credit to farmers (Bolwig, Gibbon, and Jones 2009; Delgado et al. 1999). Some processors grow the crop on their own land *and* purchase from contract growers.

Types of Contract Farming

There are several ways to classify contract-farming schemes. First, there is the degree of formality in the contract itself. In some cases, the contract is little more than an oral agreement between a farmer and a buyer. At the other extreme, the contract is a formal written document that specifies input use, production methods, minimum quality standards, and purchase price. Formal contracts are more commonly offered by large processing or exporting firms, particularly when purchasing from medium- to large-scale farmers.

Second, contract farming schemes can be classified by the types of commitments made between buyer and seller. In a seminar article on contract farming, Mighell and Jones (1963) classify contract farming schemes into three categories:

- A *market-specifying contract* describes the terms of the sales transaction with regard to price, quantity, timing, and product attributes.
- In a *resource-providing contract*, the buyer also provides agricultural inputs and technical assistance on credit.
- The third type is the *production-management contract*, which specifies the manner in which the commodity is to be grown, such as the planting density, use of pesticides, and timing of harvest.

In practice, however, many contracts combine elements of all three types. For example, the contract may specify the production methods and the terms of sale, as well as providing inputs to farmers on credit (Martinez 2002).

A third dimension in contract farming is the way the price is determined and paid. In some cases, the price is fixed at planting time by the buyer. If the market price is higher, side-selling may occur (a farmer violates the terms of the contract by selling some or all of their harvest on the market). Conversely, if the market price is lower, the buyer may be tempted to purchase its supplies from the market rather than the contracted farmers. To avoid problems of

side-selling and side-buying, contract-farming schemes sometimes rely on formula pricing, in which the buyer agrees to pay a price based on a market price, usually the market price plus a percentage premium. Some contracts have split payments, in which the buyer makes two or more payments to the farmer.

Conditions under which Contract Farming Makes Sense

Under what conditions will contract farming be profitable for both growers and buyers? Here, we discuss the role of three factors: the type of buyer, the type of commodity, and the type of destination market.

Type of Buyer

Setting up a contract-farming scheme involves large fixed costs: the buyer needs a team of field agents who negotiate terms with farmers, distribute inputs, provide technical assistance, and collect the product. As a result, contracting is generally not worthwhile for traditional wholesalers or other small- and medium-scale buyers. Rather, the buyers in a contract-farming scheme are more likely to be large-scale processors, exporters, or supermarket chains.

Another advantage of larger-scale buyers is that they have access to capital, knowledge about production methods, and market information that farmers may not have. This provides an incentive for them to contract with farmers as a way of providing credit, technical assistance, and market guarantees.

In addition, buyers with large capital-intensive processing plants have more incentive to contract with farmers because they need a steady and reliable flow of raw materials to maintain a high capacity-utilization rate. This is particularly true if the plant purchases a large share of the locally available product, since there is more risk of supply shortfalls owing to weather or changes in the market.

Type of Agricultural Commodity

As discussed above, if a product is homogeneous and nonperishable, if quality is easily observed, and if farmers are familiar with the production methods and market requirements, then transaction costs are low. In this case, there is no need to incur the costs associated with contracts so that spot markets will be more efficient. These factors explain why spot markets are the standard form of vertical coordination between farmers and buyers in the markets for staple grains, starchy root crops such as cassava, and pulses. Even perishable fruits and vegetables, when widely grown and intended for rural consumption,

are usually sold on the spot market, although there are often informal relationships between farmers and buyers which may serve some of the functions of formal contracts.

More vertical coordination is required, however, for commodities with the following characteristics:

- *Economically important quality variation.* Vertical coordination is more likely if consumers are willing to pay a premium for a variety or attribute that will cover the additional cost of producing it and the cost of vertical coordination. Farm-level investments in human capital (skills), physical capital (assets), or specialized inputs are required to raise quality. In this case, vertical coordination is needed to provide producers with the incentives and the means to make those investments.
- *High value-bulk ratio.* If the per-kilogram value of the crop is high, then a given percentage premium for higher quality is more likely to cover the incremental cost of contracting.
- *Perishability.* Not all perishable goods are produced under contract, but perishability means that farmers and buyers need to coordinate the timing of harvest and delivery, thus increasing the incentive for some form of vertical coordination. In addition, a farmer's bargaining power is seriously weakened once the product is harvested unless there is a contract (or a personal relationship) that ensures a fair price.
- *Technically difficult production.* If buyers can reduce the cost of production with technical expertise, specialized inputs, or credit, then vertical coordination is useful in transferring these resources to farmers. The buyer may also provide inputs on credit to farmers who may not have the liquidity to purchase inputs at planting time.

In the choice between contracting and vertical integration, an important factor is *scale complementarity*, which is the degree of similarity of the economies of scale in production and processing. If both production and processing have significant economies of scale (and large plots of land are available for purchase or lease), then processors and exporters are more likely to vertically integrate into direct agricultural production (Minot 1986).

Similarly, if both production and processing can be done on a relatively small scale, then vertical integration is again feasible. However, if there are large economies of scale in processing but no economies of scale in production,

it is more likely that the processor will source their raw materials from independent farmers.

Type of Destination Market

The third factor is the destination market. The more quality-sensitive the final market and the more demand there is for food safety, the greater the incentive for vertical coordination to increase control over the production process. The same commodity may be sold on the spot market for local, rural consumers and grown under contract farming schemes for urban supermarkets and exporters. Some researchers argue that tighter food safety standards in the United Kingdom are creating incentives for horticultural exporters in Kenya to switch from small-scale contract farmers to large-scale contractors and vertically integrated operations because it is difficult for the exporter to monitor and document the production practices of many small-scale farmers (Dolan and Humphrey 2000). In Shandong Province, China, apples for export to Japan are grown by vertically integrated orchards–packing houses, apples for sale to urban supermarkets are often grown under contract, and farmers sell apples for local consumption to wholesalers in spot markets (Hu 2005).

Another example in which the same commodity is grown with and without vertical coordination depending on the destination market is organic food production. For example, although rice is rarely grown under contract, organic rice production is often organized under a contract-farming scheme (Setboonsarng, Leung, and Cai 2006).

A third example is seed production. Seeds must be grown under carefully monitored conditions to minimize the risk of seed-borne diseases and avoid mixture with other seed. Seed companies typically use contract farmers, particularly for the later generations of seed multiplication, to reduce the costs of production and achieve larger volumes. Farmers would be reluctant to take these additional measures unless they were assured of a price premium above the price of the food crop (Simmons, Winters, and Patrick 2005).

Experience with Contract Farming

In this section, we look at the experience of contract farming. First, we discuss the patterns of contract farming in developing countries. Second, we review studies that attempt to assess the impact of contract-farming schemes on farmers who participate. Finally, we summarize studies that provide information on the types of farmers who participate in contract-farming schemes, particularly on whether poor farmers can benefit from contract farming.

Prevalence of contract farming in developing countries

How common is contract farming in developing countries? In the cotton-growing countries of western Africa, the proportion of farmers involved in some form of contract farming (including government-managed schemes) is relatively high. In Benin, one of the countries most dependent on cotton production, about one-third of the farmers grow cotton and are, thus, involved in contract production (Minot and Daniels 2005). In Kenya, the proportion may be more than 25 percent because of the large number of contract producers of tea and vegetables (Jaffee 1994). However, most inventories of contract-farming schemes in individual countries identify only four to eight schemes, each of which has between several hundred and several thousand contract farmers (see Dannson et al. 2004). Given that most developing countries have more than one million farm households, this suggests that in many countries, the proportion of farm households involved in contract farming is probably in the range of 1–5 percent. Table 4.1 summarizes the results of several studies that estimate the share of rural households involved in contract farming (using various definitions).

Patterns of Contract Farming by Commodity

As discussed above, the prevalence of contract farming tends to vary significantly across commodities as a result of differences in perishability, quality sensitivity, economies of scale in production and processing, and other factors. However, as will be evident, there is a fair amount of diversity in the forms of vertical integration within each commodity because of differences in the buyer, the destination market, and the policy environment.

- *Horticulture.* Fruits and vegetables that are destined for local consumption in unprocessed form are generally sold through traditional market channels (assembler–wholesaler–retailer) without contractual agreements. However, horticultural production for export often commands specific requirements regarding quality, quantity, timing, or production methods which can only be met through a contractual relationship. Similarly, processors who produce (for example) tomato paste and fruit juice often contract the production of their raw materials to ensure that quality standards are met and to stagger production. Examples include contract farming of vegetables for export in Kenya (Jaffee 2003), Madagascar (Minten, Randrianarison, and Swinnen 2009), Senegal (Swinnen and Maertens, 2007), China (Miyata, Minot, and Hu 2009), and Latin America (Swinnen and Maertens 2007). In most of these cases, the horticultural

TABLE 4.1 Estimates of the prevalence of contract farming in developing countries

Country	Source	Estimated prevalence of contract farming
Kenya	Jaffee (1994), based on inventory of contract-farming schemes	About 25 percent
Benin	Minot and Daniels (2005), based on a stratified random sample of 899 farm households	34 percent (includes only contract cotton growers)
Uganda	Stratified random sample survey of 1,440 rural households carried out in 2012–2013	5 percent had a contract with a buyer (either pre-planting or pre-harvest)
Ethiopia	Stratified random sample survey of 3,000 rural households carried out in 2012	0.2 percent had pre-planting contracts, 2.0 percent had pre-harvest contracts, and 2.2 percent had any contract
Ghana (northern)	Stratified random sample survey of 1,290 rural households in northern Ghana carried out in 2010	3 percent had a contract with a buyer (either pre-planting or pre-harvest)
Vietnam (four provinces)	Stratified random sample survey in four provinces of Vietnam in 2011	5 percent had pre-planting contracts with buyer of main crop, 13 percent received an advance payment from buyer
Kenya, Madagascar, Mali, Mexico, Morocco, Nicaragua, and Senegal	Losch, Fréguin-Gresh, and White (2011), based on nonrandom surveys in seven countries with a total sample of 7,200 households	7.4 percent of households had any type of contract, including post-planting informal agreement with buyer

Source: Authors.

products were being produced for export and contracted by a processor or exporter.

- *Tobacco*. This crop is suitable for small-scale production because it is labor-intensive and requires careful attention to maintain quality. At the same time, tobacco production requires good seed, lime, fertilizer, and drying facilities, which are beyond the means of many small farmers. Virginia tobacco has greater economies of scale because of the need for flue-curing facilities. Small-scale production of tobacco under contract is practiced in Malawi (Agar and Chiligo 2008), Madagascar (Barrett et al. 2012), India (Singh 2002), Thailand (Singh 2005a), Indonesia (Simmons, Winters, and Patrick 2005), and Chile and Guatemala (Swinnen and Maertens 2007).
- *Sugarcane*. The economies of scale in sugar processing mean that sugar mills are typically fairly large. Sugarcane is highly perishable and must be delivered to the mill within 1–2 days of harvesting. Given the very low value–bulk ratio, sugarcane must be grown relatively close to the sugar mill

to reduce transport costs. The two dominant forms of vertical coordination in sugar production are large-scale plantations owned by the refinery and contract farming. In developing countries, these two forms are often combined in the form of a nucleus estate with outgrowers. Examples of contract farming of sugarcane can be found in Malawi (Agar and Chiligo 2008), Thailand (Eaton and Shepherd 2001), Indonesia (Simmons, Winters, and Patrick 2005), India (Singh 2005b), and Guatemala and Nicaragua (Swinnen and Maertens 2007).

- *Cotton*. In many developing countries, state-owned enterprises managed cotton marketing and exports that provided cotton seed, fertilizer, and extension services to farmers on credit. In Cameroon, Chad, Mali, and Senegal, a state enterprise with a legal monopoly on cotton marketing and exports remains. However, in Burkina Faso, Côte d'Ivoire, Ghana, and Mozambique, the cotton sector has been liberalized, but regulations give local monopolies to the private cotton gins. The local monopoly (or concession) makes it easier to ensure repayment, thus facilitating contract farming and the provision of inputs on credit (Tschirley, Poulton, and Labaste 2009). There are also examples from outside Africa, including India (Singh 2005b; Barrett et al. 2012) and Thailand (Singh 2005b).
- *Tea*. This crop is produced both on large-scale plantations and by small farmers. Grosh (1994) argues that contract farming is almost essential for small-scale tea production because of the perishability of the leaves and the reluctance of farmers to invest in perennial crops without some assurance of a market. The Kenya Tea Development Agency (KTDA) is a former state enterprise which was privatized in 2000. By 2009, the KTDA had 54 tea factories and 562,000 contract tea growers (Mbadi 2010). Contract production of tea can also be found in India (Singh 2005b), South Africa (Kirsten and Sartorius 2002), Zimbabwe (Eaton and Shepherd 2001), and Vietnam (Saigenji and Zeller, 2009).
- *Coffee*. This crop is sometimes produced on large-scale plantations, notably in Brazil, but often by smallholders, particularly in Africa south of the Sahara and in Vietnam. There are few documented cases of contract farming in coffee. Coffee cooperatives have played a major role in organizing production in several countries such as Cameroon, Ethiopia, and Uganda, although market liberalization has reduced their role (Tilahun 2007; Dannson et al. 2004). A review of contract farming in Malawi could not find any cases of coffee being contracted (Agar and Chiligo 2008).

Similarly, an inventory of Latin American contract-farming schemes did not include any examples of coffee (Swinnen and Maertens 2007). One case of contract farming in coffee involves an exporter of organic coffee in Uganda (Bowlig, Gibbon, and Jones 2009). The fact that tea is often contracted while coffee is not may be related to the larger economies of scale in tea processing. Coffee processing is generally carried out by small traders and cooperatives with fewer means and less ability to organize contract production.

- *Seed*. Early generations of new varieties are multiplied on farms owned by seed companies or agricultural research institutes, but the later generations in the process are often grown by contract farmers. The contracts are used to ensure that farmers use appropriate practices to maintain seed quality and purity (Simmons, Winters, and Patrick 2005; Kumar et al. 2010).
- *Grains for breweries*. Large-scale brewers need a steady supply of sorghum, maize, and/or barley. In addition, they may require a variety that is different from what farmers would grow for the local market or for home consumption. In this case, contracting helps coordinate farmer supply to meet processor demand (Swinnen and Maertens 2007).
- *Poultry*. Although not widely documented in Africa south of the Sahara, commercial poultry production in Asia is often carried out on a contract basis. Large poultry or feed companies contract medium-scale farmers, providing them with chicks, feed, and technical assistance, and buying the broilers when they reach maturity (Birthal, Gulati, and Joshi 2005; Simmons, Winters, and Patrick 2005; Ramaswami, Birthal, and Joshi 2006).
- *Dairy*. Commercial smallholder dairy production is often organized either by cooperatives or by private processors using contract producers. Vertical coordination is needed because of the perishability of milk, the economies of scale in processing, and the need for processors to ensure a steady flow of raw material. In India, milk marketing has traditionally been organized by state-supported cooperatives. Recent economic reforms have allowed the emergence of private processors, both local and international, who contract with small producers (Birthal et al. 2008). The melamine food safety scandal in China resulted in policy changes to encourage dairy farmers to bring their cattle to centralized production facilities where quality could be better monitored, a system which could be considered contract production

(Mo et al. 2012). Contract dairy production has also been studied in Vietnam and Tanzania (Chapter 11; Hill, Temu, and Torero 2012).

- *Rubber.* Indonesia, Malaysia, and Thailand are the largest rubber producers in the world (FAO 2011b). Contract production of rubber in Malaysia represents one of the largest schemes in the world, with more than 100,000 farm households. On a smaller scale, contract farming is also used to produce rubber in western and central Africa. Rubber is grown by outgrowers, usually linked to a nucleus estate. The contract provides credit for the high cost of raising the trees to maturity, which may take seven years. Outgrowers have lower yields than the estates, but they can more easily adjust during periods of low prices because they grow other crops and do not depend exclusively on rubber income (Baumann 2000; Brüntrup and Peltzer 2006).
- *Oil palm.* Similar to rubber production, the largest oil palm producers are Indonesia, Malaysia, and Thailand, though it is also grown widely in Colombia and West Africa (FAO 2011b). It is often grown on nucleus estates with outgrowers. Newer high-yielding varieties respond well to weed control and regular maintenance, shifting the advantage from smallholders to estate production (Baumann 2000). Cahyadi and Waibel (2013) report that 40 percent of Indonesian oil palm is grown by smallholders, many of whom produce under contract.

This section confirms that contract farming schemes have been organized to grow a wide range of commodities, particularly high-value commercial crops to be purchased by large-scale processors or exporters and destined for a quality-sensitive market. It is worth noting that, apart from seed production, there are few cases of contract production of staple grains. For example, Reardon et al. (2014) carried out farm surveys in Bangladesh, China, India, and Vietnam and found “nearly zero contracting by mills of farmers.”

Impact of Contract Farming on Participating Farmers

Economic logic would suggest that well-informed farmers will not voluntarily enter into contracts with buyers unless they believe there will be benefits. However, the actual impact may be negative because of misperceptions or lack of information. If the contract-farming scheme involves tree crops or other transaction-specific investments, farmers may be locked into an arrangement that is not beneficial. Finally, contract farming may bring benefits to the

farmers who make the decision, but have negative effects on other members of the household or the community.

Early reviews of the literature concluded that most studies suggest that farmers benefit from contract farming because it provides them with inputs on credit, technical assistance, and often a guaranteed price, allowing them to produce a higher-value commodity than would otherwise be possible (Glover 1984; Minot 1986). Little and Watts (1994) provide a more skeptical view of the benefits of contract farming based on a set of seven case studies of contract farming in Africa south of the Sahara. These studies focus on conflicts between farmers and the contracting firms, the imbalance of power between the two parties, intrahousehold tensions over the division of labor and new revenue, and increasing rural inequality. Similarly, Porter and Phillips-Howard (1997) conclude that contract farming generally raises farmer incomes, but may also cause social problems.

More recent studies use farm surveys to compare income and other outcome variables for contract farmers and other similar farmers. Most of these studies use econometric analysis to control for differences in farm size, education, and other observable characteristics that might explain income differences. Some of them use instrumental variables approaches to control for selection bias, since contract farmers may be different from other farmers in ways that are not easily observable, such as industriousness or management skill. Table 4.2 summarizes the results of studies of the impact of contract farming on crop revenue or farm income.

The weight of evidence suggests that successful contract-farming schemes generally raise the incomes of farmers who join them. The range of income gains associated with contract farming is from -49 percent to +700 percent, but most of the cases fall between 25 percent and 75 percent. The cases where contract farming does not generate benefits for farmers, in terms of either higher income or more stable income, are often short-lived as the scheme collapses.

Participation of Small Farmers in Contract Farming

Even if farmers benefit from their contractual relations with processors and exporters, there is the issue of whether small farmers can participate in contract-farming schemes. Some critics of contract farming argue that firms tend to work with medium- and large-scale farmers (Little and Watts 1994; Singh 2002). If so, contract farming may be an interesting institutional mechanism for vertical coordination, but it would have less relevance for poverty reduction strategies. In fact, by contributing to income inequality, it may exacerbate tensions between the social groups in rural areas.

TABLE 4.2 Studies examining the impact of contract farming on income or revenue

Study	Location	Commodities	Results
Little and Watts (1994)	Africa	Various	Case-study analysis of several schemes. Concludes that incomes increased for a moderate to high proportion of farmers, but highlights range of problems including conflicts between farmers and the contracting firms, the imbalance of power, intrahousehold tensions, and rural inequality
Porter and Phillips-Howard (1997)	Africa	Various	Review of contract farming. Finds that farmer incomes were raised from contracting but that there are possible problems caused by lack of control over production, intrahousehold conflict, income inequality, and power
Singh (2002)	India	Vegetables	Review of various schemes. Focuses on problems of power imbalance between farmers and firms, violation of terms, and social differentiation, but also finds higher incomes and satisfaction with participation in contract-farming schemes
Warning and Key (2002)	Senegal	Groundnut	Treatment-effects model used to estimate impact on income. Participation increases gross agricultural revenues 56 percent over the average for noncontracting farmer
Simmons, Winter, and Patrick (2005)	Indonesia	Poultry, maize, and rice	Contracting was associated with improved returns to capital for poultry and maize seed, but not for rice seed. Contract farmers had a 71 percent increase in gross margin for seed maize and 160 percent increase in gross margin for broilers over sample average
Birthal, Gulati, and Joshi (2005)	India	Dairy, vegetables, and poultry	Most dairy and vegetable farmers would prefer to grow under contract, but most poultry farmers would not. Contract poultry growers tend to be less experienced and leave scheme when they become more experienced
Ramaswami, Birthal, and Joshi (2006)	India	Poultry	Based on an instrumental variables (IV) regression analysis, contract poultry growers earn 36 percent more per kilogram per production cycle than independent growers. Also, contract growers had lower variability in gross margins across production cycles
Birthal et al. (2008)	India	Dairy	Contract dairy production is more profitable than independent contract production, mainly because of the lower transaction costs associated with contract production. A treatment-effects model suggests that participation in contract production increases net revenue more than 80 percent compared to the average
Bolwig, Gibbon, and Jones (2009)	Uganda	Coffee	Positive revenue effect for contract farmers compared to a control group of noncontracting farmers. With full-information maximum likelihood (FIML) estimation, the average effect is a revenue increase of 75 percent in net coffee revenue relative to the counterfactual of nonparticipation
Miyata, Minot, and Hu (2009)	China	Apples and green onions	Treatment-effects model finds a 38 percent increase in income associated with contract farming. In the case of apple production, the additional income is largely attributed to higher yields, while in the case of green onions, the prices received by contract farmers were higher than those received by noncontract growers

Study	Location	Commodities	Results
Saigenji and Zeller (2009)	Vietnam	Tea	Propensity score-matching approach used to control for effect of observable characteristics. Study finds that participation in contract tea production raises household income by 40 percent above that of similar noncontract farmers
Jones and Gibbon (2011)	Uganda	Cocoa	Contract participation increased real net cocoa revenue by 58–168 percent, depending on the econometric model used
Bellemare (2012)	Madagascar	Vegetables, fruit, and grain	Results indicate that a 1 percent increase in the likelihood of participating in contract farming is associated with a 0.5 percent increase in household income. This implies that the average effect has an upper limit of 50 percent of income. The study also found that participation increases income from noncontract crops and from livestock production
Freguin-Gresh, Anseeuw, and D'Haese (2012)	South Africa	Fruit, vegetables, and poultry	Contract farmers benefit from higher incomes, better access to services and resources, and opportunities to participate in new markets. Study finds a sevenfold increase in income, significant at 5 percent level. However, contract farming is not widespread and mostly involves the better-off farmers
Cahyadi and Waibel (2013)	Indonesia	Palm oil	Results show that while contract farming has a significant positive effect on smallholder income overall, it discriminates against poorer smallholders. Estimates that contract participation increased net household income by 60 percent (significant at the 10 percent level)
Dedehouanou, Swinnen, and Maertens (2013)	Senegal	Horticulture	Results of a survey indicate that horticultural farmers producing under contract report higher levels of happiness than those not under contract
Narayanan (2014)	India	Gherkins, papaya, marigold, and poultry	Participation in contract farming estimated to have increased profits of gherkin farmers by 21 percent, papaya farmers by 32 percent, poultry farmers by 150 percent. Contract farmers in marigold earned 49 percent lower profits than they would have outside the scheme

Source: Authors.

Other things being equal, firms would generally rather work with a small number of larger farmers than a large number of small farmers. The transaction costs associated with negotiation, technical assistance, the monitoring of quality, and collection of harvest would certainly be less if the firm works with a smaller number of larger farmers.

However, all other factors are not equal. Family labor used by small farmers has a lower implicit wage rate than the wage laborers hired by medium- and large-scale farmers. Also, family labor is better motivated than hired laborers to respond to problems such as disease or pest attack as they occur during the crop cycle. According to Birthal, Gulati, and Joshi (2005), firms

in India often found it more convenient to contract with smallholders (1) to reduce the risk of crop failure by spreading production, (2) to achieve higher quality when intensive management is required, and (3) to reduce labor costs because of the lower implicit wages of family labor. Cooperatives and other types of farmer organizations can serve as intermediaries, reducing the cost to the buyer of dealing with a large number of small farmers.

A number of studies compare the characteristics of contract and non-contract farmers in terms of farm size, assets, and experience, as an indicator of the pro-poor impact of contracting (Table 4.3). Several studies find that contract farming favors larger farmers (see Wang, Zhang, and Wu 2011; Guo, Jolly, and Zhu 2005).

Other studies find little or no difference between contract and non-contract growers (Warning and Key 2002; BIRTHAL, Gulati, and Joshi 2005; Miyata, Minot, and Hu 2009). Indeed, there are cases where contract farmers tend to be smaller or less experienced. Presumably, they use contracting as a way to learn the business. Eventually, having acquired some experience, they leave the scheme to become independent growers. This was the case in studies of contract farmers in Costa Rica (Saenz and Ruben 2004), poultry growers in India (Ramaswami, BIRTHAL, and Joshi 2006), and poultry growers in Indonesia (Simmons, Winters, and Patrick 2005).

A few studies give examples of buyers shifting from small- to large-scale farmers or the reverse. Minot and Ngigi (2010) describe the evolution of several contract-farming schemes in Kenya, including one (Del Monte pineapple) that gave up on contract production and shifted to vertically integrated plantation production. As discussed earlier, green bean exporters in Senegal switched from small-scale contract production to large-scale contract production (Maertens and Swinnen 2009). International tomato processors in Mexico first contracted with large growers but then involved small growers—partly because, as a lucrative market for fresh tomatoes developed, firms found it increasingly difficult to enforce contracts they had with larger growers (Key and Runsten 1999).

These findings confirm that the comparative advantage of small farmers is not a static concept, but it can change as farmers and buyers experiment and learn from experience.

Challenges Facing Contract Farming

Although numerous studies confirm that contract farmers gain from participation, the studies also reveal frequent problems in these schemes. In fact, there is a relatively high rate of failure for contract-farming schemes in

TABLE 4.3 Studies examining small farmer participation in contract farming

Study	Location	Commodities	Results
Key and Runsten (1999)	Mexico	Tomato	Large tomato processors from the United States first contracted with large growers in Mexico, but later shifted toward small growers
Warning and Key (2002)	Senegal	Groundnut	Asset ownership is not a significant predictor of contract participation
Minot and Ngigi (2010)	Côte d'Ivoire, Kenya	Horticulture	Describe the evolution of several contract-farming schemes in Kenya, including one (Del Monte pineapple) that gave up on contract production and shifted to vertically integrated plantation production
Maertens and Swinnen (2009)	Senegal	Green bean	Green bean exporters in Senegal switched from small-scale contract production to large-scale contract production
Saenz and Ruben (2004)	Costa Rica	Chayote squash	Study of contract farming in Costa Rica found that younger, less-experienced growers were more likely to grow under contract
Simmons, Winters, and Patrick (2005)	Indonesia	Poultry, maize, rice	Irrigation, age of head of household, and education were all found to be positive indicators of participation in contract farming across three sites in the country
Guo, Jolly, and Zhu (2005)	China	Fruits, vegetables, tea, livestock	Specialization and commercialization along with distance from market and government support are shown to predict the likelihood that farmers engage in contract farming
World Bank (2006)	China	Fruits, vegetables	A fruit and vegetable exporter in China that started producing its own horticultural products on company land and later shifted to smallholder contract production
Birthal, Gulati, and Joshi (2005)	India	Dairy, poultry, vegetables	Experience and non-farm income are found to be significant indicators of contract farming for the dairy, vegetable, and broiler industries
Miyata, Minot, and Hu (2009)	China	Apples and green onions	A probit model for the participation in contract farming shows no preference for larger farmers
Wang, Zhang, and Wu (2011)	China	Vegetables	Risk attitudes are found to be a significant determinant of contract farming, with more risk-tolerant farmers preferring contracts
Narayanan (2012)	India	Vegetables and poultry	Surveys of contract and noncontract farmers for various commodities find that participation is determined as much by location as household characteristics
Cahyadi and Waibel (2013)	Indonesia	Palm oil	Migrant status, household head age, plot size, and time since farm establishment are all significant predictors of participating in contract farming
Narayanan (2013)	India	Vegetables and poultry	Survey of 822 farmers reveals significant attrition in contract-farming schemes over time. Poor farmers from marginalized social groups are more likely to exit than other farmers, although some depart voluntarily

Source: Authors.

developing countries. This is particularly evident in Kenya, which has a history of contract farming going back to the colonial period. Reviews of the evolution of contract-farming schemes in Kenya reveal a high rate of turnover as schemes collapse and new ones are launched (Jaffee 1994; Minot and Ngigi 2010). Similarly, Sartorius, Kirsten, and Masuku (2004, 89) note “the high level of failure of small-scale farmer contract farming projects in developing countries.” Singh (2002) provides a list of numerous contract-farming schemes in India that failed for one reason or another.

One policy constraint on contract farming is legal restrictions on direct contact between farmers and agribusiness firms, such as processors and exporters. These regulations are intended to protect farmers from being exploited by large companies. The effect, however, is to force processors to vertically integrate and produce their own raw materials, to purchase from large-scale commercial farms, or to purchase from cooperatives. Birthal, Gulati, and Joshi (2005) list a number of regulatory constraints that impeded the establishment and growth of contract-farming schemes in India.

Another perennial problem with contract-farming schemes is the high cost of dealing with large numbers of dispersed contract farmers. This is particularly true when the company distributes inputs, provides credit, and organizes the collection of the crop. Sartorius, Kirsten, and Masuku (2004) argue that this is one of the main reasons why companies often prefer to work with larger-scale farmers. One solution is to have another organization to act as intermediary between the company and the farmers. An NGO, a donor-funded project, or a cooperative may help organize farmers (Narrod et al. 2009; Coulter et al. 1999). In China, village leaders sometimes serve as intermediaries between the company and contract farmers. They recruit contract farmers, explain the terms, and help enforce loan repayment and product delivery (Miyata, Minot, and Hu 2009).

One of the most common problems in ongoing contract-farming schemes is *side-selling*, the sale of contracted output to other buyers. Farmers try to sell to other buyers to take advantage of a better price or to avoid repayment of inputs they received on credit. Since the contracts are generally not legally enforceable,² the only leverage the firm has is to refuse to work with the farmer in the future. Coulter et al. (1999) list a number of approaches that have been taken to reduce default: group lending, information sharing among buyers, incentives for repayment, good communication, and close monitoring.

2 Although the contract may be legally binding in theory, it is often not worthwhile to either party to bring a case to court given the high costs relative to the value in dispute.

As an example of the second point, when cotton markets were liberalized in Benin, the government established a clearinghouse for information on farmers who are producing cotton and receiving inputs on credit. This information makes it easier to punish both the farmer who violates the terms of their contract and the buyer who knowingly purchases cotton from growers who have contracts with other companies. By tightening up on farmer default, the system of input credit has been preserved (Goreux 2003).

A related problem is that when market prices fall below the contracted price, the processor may be tempted to import or purchase from the open market instead of from contract growers. Although the company may be under pressure to respect the terms of the contract, it can impose strict quality standards on the contractors to avoid purchasing from them at the agreed price. The main leverage that farmers have is to withdraw from the scheme or to bring the case to local officials for intervention. Several studies have shown that third-party certification can address this problem (Chapter 11; Hill, Temu, and Torero 2012).

Conclusion

Contract farming is defined as agricultural production that takes place under a pre-planting agreement between the farmer and the eventual buyer. It is mostly likely to be economically justified when the buyer is a large processor, exporter, or retail chain; when the commodity has a high value–bulk ratio, is perishable, and/or is not widely grown; and where the destination market is willing to pay a premium for attributes that are not easy to obtain through spot markets. In practice, this means that contract farming will be most suitable for fruits and vegetables for quality-sensitive markets; commercial dairy and poultry production; and cash crops such as tea, tobacco, sugarcane, and cotton. Contract farming is generally not suitable for grain production, except in the case of seed, organic grains, barley for large-scale breweries, or niche grain products for export.

Econometric analysis can be used to evaluate the impact of contract farming on household income, but it is important to take into account the fact that contract farmers may differ in other respects (such as education, farm size, or industriousness) from other farmers. Across the 20 econometric studies of the impact of contract farming, the estimated increase in income ranged from –49 percent to 600 percent, but most of the studies found an increase in income of between 25 percent and 75 percent. This is not surprising given that contract-farming schemes which do not provide higher incomes (or some

other benefit such as more stable income) to participating farmers are likely to lose farmers and eventually fail.

The evidence suggests that in many cases companies are willing to work with small farmers, but some crops have economies of scale that favor medium- and large-scale farmers. Numerous studies have found that farm size was not a significant determinant of participation in a contract-farming scheme, and several more found that contractors preferred smaller farmers. On the other hand, some studies have found that contract farmers were larger than average. Commodity and policy differences may partially explain the contrasting results. Finally, contractors may shift their strategy over time as they gain experience or as market conditions change, and these shifts can go in either direction.

One of the most common problems in contract farming is side-selling, when farmers sell to other buyers to avoid repaying loans or simply to obtain a better price. In addition, there are numerous cases of companies who are unable or unwilling to pay the negotiated price and use quality standards to evade their commitments. Third-party certification is one promising way to address this problem. A third problem is the high cost of working with large numbers of small farmers, though this problem can be ameliorated with the use of farmer organizations or other intermediaries. Because of these problems, there is a relatively high rate of failure in contract-farming schemes.

A major limitation of contract farming is that it is only appropriate for high-value commodities being sold to large-scale buyers for quality-sensitive markets. For most developing countries, the proportion of farmers involved in contract farming is probably in the range of 1–5 percent. Furthermore, it is unlikely that contract farming can be scaled up to reach the majority of small farmers who produce grains and other staple foods.

The fact that most contract farming schemes raise the income of participating farmers and that small farmers are often (but not always) able to participate suggests that governments should create a policy environment that facilitates the formation of contract-farming schemes, particularly when they incorporate small farmers. In particular, the following policy goals should be considered.

Improve the investment climate: Contract-farming schemes are usually organized by large-scale processors, exporters, or supermarket chains. Thus, an investment climate that facilitates private investment in agribusiness sectors is a necessary precondition for the development of private contract-farming schemes.

Legalize direct firm–farm contracts: The government can facilitate contract farming and other forms of vertical coordination by removing legal

restrictions that prevent firms from buying directly from farmers in some countries. The government's role should be to ensure that both parties in an agreement understand and accept the terms.

Develop effective grades and standards: The establishment of grades and standards that are easy to implement and that reflect attributes demanded by consumers will facilitate communication and negotiation between buyers and farmers, and among traders. It will also make it easier for buyers to establish contracts with farmers, given that quality control is often a contentious issue.

Facilitate farmer organizations and other intermediaries: Local officials and extension agents can play a role in allowing and even promoting the development of intermediary organizations that reduce the transaction cost associated with dealing with a large number of small farmers.

Promote public-private partnerships in extension: If extension services have the flexibility to provide services on behalf of the contracting firm and the incentives to serve small farmers, it reduces the cost to the firm of working with small farmers.

Promote competition: One of the best approaches for limiting the power of contracting companies is to allow or promote competition among firms. Policymakers should be cautious about responding to requests from agribusiness firms for a regional monopsony. At the same time, it is important to recognize that competition makes it easier for farmers to avoid repayment of input credit. It may be possible to enforce repayment without stifling competition, such as by creating credit clearing houses and forming professional bodies with codes of conduct.

Provide mediation services: One of the most common problems in contract farming is violation of the contract. If the market price rises during the agricultural season, farmers are tempted to sell to other buyers, particularly since doing so means they can avoid repaying the input credit. On the other hand, if the market price falls, the buyer is tempted to procure raw materials on the open market and/or apply quality standards more strictly. Government officials, particularly extension officers, sometimes play a role in mediating between contract growers and the buyer. Alternatively, they could help organize a nongovernmental mediation board with members acceptable to both sides.

Enforce contracts: The government should explore alternative approaches to enforcing contracts, particularly between buyers and farmers. This could take the form of establishing small-claims courts or collecting and disseminating information on noncompliance on the part of both farmers and buyers. Providing better information about noncompliance will increase the

incentives for farmers and firms to comply and help each party avoid high-risk business partners.

It is likely that contract farming will expand in developing countries as local diets shift away from cereals and staple root crops, as markets link small farmers with quality-sensitive markets in the major cities and abroad, and as the share of agricultural output that is processed increases. The policy measures discussed above can help facilitate this shift toward more structured market channels that give farmers the opportunity to benefit from changing demand. However, contract farming is only one component in an agricultural strategy to raise incomes and reduce rural poverty. Efforts to promote contract farming should not distract from investments in rural infrastructure, agricultural research and extension, market information systems, and social safety nets, all of which have broad-based impact on rural livelihoods.

References

- Agar, J., and P. Chiligo. 2008. *Contract Farming in Malawi*. Prepared by Kadale Consultants for the Ministry of Agriculture and Food Security, Malawi.
- Barrett, C. B., M. E. Bachke, M. F. Bellemare, H. C. Michelson, S. Narayanan, and T. F. Walker. 2012. "Smallholder Participation in Contract Farming: Comparative Evidence from Five Countries." *World Development* 40 (4): 715–730. <http://dx.doi.org/10.1016/j.worlddev.2011.09.006>.
- Baumann, P. 2000. *Equity and Efficiency in Contract Farming Schemes: The Experience of Agricultural Tree Crops*. Working Paper 139. London: Overseas Development Institute.
- Bellemare, M. F. 2012. "As You Sow, So Shall You Reap: The Welfare Impacts of Contract Farming." *World Development* 40 (7): 1418–1434. <http://dx.doi.org/10.1016/j.worlddev.2011.12.008>.
- Birthal, P., A. Gulati, and P. K. Joshi. 2005. *Vertical Coordination in High-Value Food Commodities: Implications for Smallholders*. Markets, Trade, and Institutions Division Discussion Paper No. 85. Washington, DC: International Food Policy Research Institute.
- Birthal, P. S., A. K. Jha, M. Tiongco, C. Delgado, and C. Narrod. 2008. *Improving Farm-to-Market Linkages through Contract Farming—A Case Study of Smallholder Dairying in India*. Discussion Paper No. 0814. Washington, DC: International Food Policy Research Institute.
- Bolwig, S., P. Gibbon, and S. Jones. 2009. "The Economics of Smallholder Organic Contract Farming in Tropical Africa." *World Development* 37 (6): 1094–1104. <http://dx.doi.org/10.1016/j.worlddev.2008.09.012>.

- Brüntrup, M., and R. Peltzer. 2006. *Outgrowers: A Key to the Development of Rural Areas in Sub-Saharan Africa and to Poverty Reduction*. Report of a workshop organized by Deutsche Investitions- und Entwicklungsgesellschaft (DEG) and Deutsches Institut für Entwicklungspolitik (DIE), Bonn, Germany. www.die-gdi.de/uploads/media/Outgrowers_sub-saharan-african_rural_areas.pdf.
- Cahyadi, E. R., and H. Waibel. 2013. "Is Contract Farming in the Indonesian Oil Palm Industry Pro-Poor?" *ASEAN Economic Bulletin* 30 (1): 62. <http://dx.doi.org/10.1355/ae30-1d>.
- Coulter, J., A. Goodland, A. Tallontire, and R. Stringfellow. 1999. *Marrying Farmer Cooperation and Contract Farming for Service Provision in a Liberalizing Sub-Saharan Africa*. Natural Resources Perspectives, No. 48. London: Overseas Development Institute. www.odi.org.uk/nrp/48.html.
- da Silva, C. A. B. 2005. *The Growing Role of Contract Farming in Agri-Food Systems Development: Drivers, Theory and Practice*. Rome: Agricultural Management, Marketing and Finance Service, Food and Agriculture Organization of the United Nations. www.fao.org/fileadmin/user_upload/ags/publications/AGSF_WD_9.pdf.
- Dannson, A., C. Ezedinma, T. R. Wambua, B. Bashasha, J. Kirsten, and K. Sartorius. 2004. *Strengthening Farm-Agribusiness Linkages in Africa*. AGSF Occasional Paper 6. Rome: Food and Agriculture Organization. <ftp://ftp.fao.org/docrep/fao/008/y5785e/y5785e00.pdf>.
- Dedehouanou, S. F. A., J. Swinnen, and M. Maertens, M. 2013. "Does Contracting Make Farmers Happy? Evidence from Senegal." *Review of Income and Wealth* 59: S138–S160. <http://dx.doi.org/10.1111/roiw.12041>.
- Delgado, C. 1999. "Sources of Growth in Smallholder Agriculture in Sub-Saharan Africa: The Role of Vertical Integration of Smallholders." *Agrekon* 38 (May): 165–189.
- Dolan, C., and J. Humphrey. 2000. "Governance and Trade in Fresh Vegetables: The Impact of UK Supermarkets on the African Horticultural Industry." *Journal of Development Studies* 37 (2): 147–176.
- Eaton, C., and A. Shepherd. 2001. *Contract Farming: Partnerships for Growth*. Agricultural Services Bulletin 165. Rome: Food and Agriculture Organization of the United Nations. www.fao.org/DOCREP/004/Y0937E/y0937e00.htm#toc.
- FAO. 2011a. FAOStat database on agricultural production. Rome: Food and Agriculture Organization of the United Nations. <http://faostat.fao.org/site/567/default.aspx#ancor>.
- . 2011b. FAOStat database on agricultural trade. Rome: Food and Agriculture Organization of the United Nations. <http://faostat.fao.org/site/535/default.aspx#ancor>.
- Freguin-Gresh, S., W. Anseu, and M. D'Haese. 2012. "Demythifying Contract Farming: Evidence from Rural South Africa." Paper presented at the International Association of Agricultural Economists (IAAE) Triennial Conference, Foz do Iguaçu, Brazil, August 18–24.

- Glover, D. J. 1984. "Contract Farming and Smallholder Out Grower Schemes in Less-Developed Countries." *World Development* 12 (11/12): 1143–1157.
- Goreux, L. 2003. *Reforming the Cotton Sector in Sub-Saharan Africa*. Africa Region Working Paper Series No. 62. Washington, DC: World Bank. www.worldbank.org/afr/wps/wp62.pdf.
- Grosh, B. 1994. "Contract Farming in Africa: An Application of the New Institutional Economics." *Journal of African Economies* 3 (2): 231–261.
- Gulati, A., N. Minot, C. Delgado, and S. Bora. 2006. "Growth in High-Value Agriculture in Asia and the Emergence of Vertical Links with Farmers." In *Global Supply Chains, Standards, and Poor Farmers*, edited by J. Swinnen. London: CAB International.
- Guo, H., W. Jolly, and J. Zhu. 2005. "Contract Farming in China: Supply Chain or Ball and Chain?" Paper presented at Minnesota International Economic Development Conference, University of Minnesota, April 29–30.
- Hill, R. V., A. Temu, and M. Torero. 2012. *Incentivizing Loyalty: Evidence from a Market Experiment in Tanzania*. Washington, DC: International Food Policy Research Institute.
- Hu, D. 2005. *Research Report on Contract Rural Households in China*. Beijing: Institute of Agricultural Economics and Development, Chinese Academy for Agricultural Sciences.
- Jaffee, S. 1994. "Contract Farming in the Shadow of Competitive Markets: The Experience of Kenyan Horticulture." In *Living under Contract: Contract Farming and Agrarian Transformation in Sub-Saharan Africa*, edited by P. Little and M. Watts. Madison, WI, US: University of Wisconsin Press.
- . 2003. *From Challenge to Opportunity: The Transformation of the Kenyan Fresh Vegetable Trade in the Context of Emerging Food Safety and Other Standards*. PREM Trade Unit. Washington, DC: World Bank.
- Jones, S., and P. Gibbon. 2011. "Developing Agricultural Markets in Sub-Saharan Africa: Organic Cocoa in Rural Uganda." *Journal of Development Studies* 47 (10): 1595–1618.
- Key, N., and D. Runsten. 1999. "Contract Farming, Smallholders, and Rural Development in Latin America: The Organization of Agroprocessing Firms and the Scale of Outgrower Production." *World Development* 27 (2): 381–401.
- Kirsten, J., and K. Sartorius. 2002. "Linking Agribusiness and Small-Scale Farmers in Developing Countries: Is There a New Role for Contract Farming?" *Development Southern Africa* 19 (4): 503–529. <http://dx.doi.org/10.1080/0376835022000019428>.
- Kumar, S., P. Chand, J. P. S. Dabas, and H. Singh. 2010. "Characteristics and Determinants of Contract Design of Wheat Seed Farming in India: A Basis of Decision Making." *Indian Journal of Agricultural Economics* 65 (4): 621–638.

- Little, P., and M. Watts. 1994. *Living under Contract: Contract Farming and Agrarian Transformation in Sub-Saharan Africa*. Madison, WI, US: University of Wisconsin Press.
- Losch, B., S. Fréguin-Gresh, and E. White. 2011. *Rural Transformation and Late Developing Countries in a Globalizing World. A Comparative Analysis of Rural Change*. Final Report of the RuralStruc Program. Washington, DC: World Bank. http://siteresources.worldbank.org/AFRICAEXT/Resources/258643-1323805221801/RuralStruc_final_report_v2_hd.pdf.
- Maertens, M., and J. F. M. Swinnen. 2009. "Trade, Standards, and Poverty: Evidence from Senegal." *World Development* 37 (1): 161–178.
- Martinez, S. 2002. *Vertical Coordination of Marketing Systems: Lessons from the Poultry, Egg, and Pork Industries*. Agricultural Economic Report No. 807. Washington, DC: US Department of Agriculture.
- Mbadi, P. K. 2010. "Engaging Tea Smallholders to Sustainable Agriculture Practices." Presentation at IDH Congress, Amsterdam, December 2–3.
- Mighell, R., and L. Jones. 1963. *Vertical Coordination and Contract Farming*. Agricultural Economics Report No. 19. Washington, DC: United States Department of Agriculture.
- Minot, N. 1986. *Contract Farming and its Effect on Small Farmers in Developing Countries*. Working Paper No. 31. East Lansing, MI, US: Michigan State University.
- Minot, N., and L. Daniels. 2005. "Impact of Declining Global Cotton Prices on Rural Poverty in Benin." *Agricultural Economics* 33 (supplement): 453–466. <http://dx.doi.org/10.1111/j.1574-0864.2005.00415.x>.
- Minot, N., and M. Ngigi. 2010. "Are Horticultural Exports a Replicable Success Story? Evidence from Kenya and Côte d'Ivoire." In *Successes in African Agriculture: Lessons for the Future*, edited by S. Haggblade and P. Hazell. Baltimore: Johns Hopkins University Press. www.ifpri.org/publication/successes-african-agriculture-1.
- Minot, N., and B. Sawyer. 2014. *Contract Farming in Developing Countries: Theory and Experience*. Report prepared for the Investment Climate Unit, International Finance Corporation. Washington, DC: International Food Policy Research Institute.
- Minten, B., L. Randrianarison, and J. F. M. Swinnen. 2009. "Global Retail Chains and Poor Farmers: Evidence from Madagascar." *World Development* 37 (11): 1728–1741. <http://dx.doi.org/10.1016/j.worlddev.2008.08.024>.
- Miyata, S., N. Minot, and D. Hu. 2009. "Impact of Contract Farming on Income: Linking Small Farmers, Packers, and Supermarkets in China." *World Development* 37 (11): 1781–1790.
- Mo, D., J. Huang, X. Jia, H. Luan, S. Rozelle, and J. Swinnen. 2012. "Checking Into China's Cow Hotels: Have Policies Following the Milk Scandal Changed the Structure of the Dairy Sector?" *Journal of Dairy Science* 95 (5): 2282–2298.

- Narayanan, S. 2012. "Geography Matters: Evidence and Implications of Spatial Selection in Contract Farming Schemes in Southern India." Manuscript, Indira Gandhi Institute of Development Research, Mumbai, India.
- . 2013. "Smallholder Attrition in Contract Farming Schemes in India: Extent, Causes and Concerns." Manuscript, Indira Gandhi Institute of Development Research, Mumbai, India.
- . 2014. "Profits from Participation in High Value Agriculture: Evidence of Heterogeneous Benefits in Contract Farming Schemes in Southern India." *Food Policy* 44: 142–157.
- Narrod, C., D. Roy, J. Okello, B. Avendaño, K. Rich, and A. Thorat. 2009. "Public–Private Partnerships and Collective Action in High Value Fruit and Vegetable Supply Chains." *Food Policy* 34 (1): 8–15. <http://dx.doi.org/10.1016/j.foodpol.2008.10.005>.
- Porter, G., and K. Phillips-Howard. 1997. "Comparing Contracts: An Evaluation of Contract Farming Schemes in Africa." *World Development* 25 (2): 227–238.
- Ramaswami, B., P. S. BIRTHAL, and P. K. JOSHI. 2006. *Efficiency and Distribution in Contract Farming: The Case of Indian Poultry Growers*. Markets, Trade, and Institutions Division Discussion Paper 91. Washington, DC: International Food Policy Research Institute.
- Reardon, T., K. Z. Chen, B. Minten, L. Adriano, T. A. Dao, J. Wang, and S. D. Gupta. 2014. "The Quiet Revolution in Asia's Rice Value Chains." *Annals of the NY Academy of Science* 1331: 106–118.
- Saenz, F., and R. Ruben. 2004. "Export Contracts for Non-Traditional Products: Chayote from Costa Rica." *Journal of Chains and Network Science* 4 (2): 139–150.
- Saigenji, Y., and M. Zeller. 2009. "Effect of Contract Farming on Productivity and Income of Small Holders: The Case of Tea Production in North-Western Vietnam." Paper presented at the conference of the International Association of Agricultural Economists, Beijing, August 16–22. <http://ageconsearch.umn.edu/bitstream/51681/2/669.pdf>.
- Sartorius, K., J. Kirsten, and M. Masuku. 2004. "A New Institutional Economic Analysis of Small-Scale Farmer Contracts and Relations in the Sugar Supply Chains of South Africa and Swaziland." Mimeo, Department of Agricultural Economics, Extension and Rural Development, University of Pretoria, South Africa.
- Setboonsarng, S., P. Leung, and J. Cai. 2006. *Contract Farming and Poverty Reduction: The Case of Organic Rice Contract Farming in Thailand*. ADB Institute Discussion Paper No. 49. Manila, Philippines: Asian Development Bank.
- Simmons, P., P. Winters, and I. Patrick. 2005. "An Analysis of Contract Farming in East Java, Bali, and Lombok, Indonesia." *Agricultural Economics* 33 (3): 513–552.
- Singh, S. 2002. "Contracting Out Solutions: Political Economy of Contract Farming in the Indian Punjab." *World Development* 30 (9): 1621–1638.

- . 2005a. "Contract Farming System in Thailand." *Economic and Political Weekly* December 31: 5578–5586.
- . 2005b. *Contract Farming for Agricultural Development: Review Theory and Practice with Special Reference to India*. CENTAD Working Paper no. 2. New Delhi: Centre for Trade and Development/Oxfam.
- Swinnen, J. F. M., and M. Maertens. 2007. "Globalization, Privatization, and Vertical Coordination in Food Value Chains in Developing and Transition Countries." *Agricultural Economics* 37 (s1): 89–102.
- Tilahun, D. 2007. "Performance of Coffee Marketing Co-operatives and Members' Satisfaction in Dale District: SNNPRS-Southern Ethiopia." MSc Thesis in Agriculture, Haramaya University. https://cgspace.cgiar.org/bitstream/10568/724/1/Thesis_TilahunPerformance.pdf.
- Tschirley D., C. Poulton, and P. Labaste, eds. 2009. *Comparative Analysis of Organization and Performance of African Cotton Sectors: Learning from Experience of Cotton Sector Reform in Africa*. Agriculture and Rural Development Series. Washington, DC: World Bank.
- Wang, H., Yanping Zhang, and Laping Wu. 2011. "Is Contract Farming a Risk Management Instrument for Chinese Farmers? Evidence from a Survey of Vegetable Farmers in Shandong." *China Agricultural Economic Review* 3 (4): 489–505.
- Warning, M., and N. Key 2002. "The Social Performance and Distributional Consequences of Contract Farming: An Equilibrium Analysis of the Arachide de Bouche Program in Senegal." *World Development* 30 (2): 255–263.
- Williamson, O. 1983. "Credible Commitments: Using Hostages to Support Exchange." *American Economic Review* 73: 519–538.
- . 2000. "The New Institutional Economics: Taking Stock, Looking Ahead." *Journal of Economic Literature* 38 (3): 595–613.
- World Bank. 2006. *China's Compliance with Food Safety Requirements for Fruits and Vegetables: Promoting Food Safety, Competitiveness, and Poverty Reduction*. Beijing: China Agriculture Press for World Bank.