Contract Farming in sub-Saharan Africa: Opportunities and Challenges

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EXECUTIVE SUMMARY

Contract farming may be defined as agricultural production carried out according to a prior 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/or other inputs on credit and offers a guaranteed price for the output.

It is useful to view contract farming as one form of vertical coordination, in between spot markets (in which supply and demand are coordinated through prices alone) and vertical integration (in which supply and demand are coordinated by having one firm carry out multiple stages in the market channel). Transaction cost economics, a branch of new institutional economics, suggests that, because contracting involves costs, it is economically justifiable only (1) when the buyer is a large firm (a processor, exporter, or supermarket chain); (2) when the product is characterized by large quality variations, perishability, technically difficult production, and/or a high value-bulk ratio; (3) when the destination market is willing to pay a premium for certain product or production attributes that can be ensured only by close coordination between farmers and buyers; and (4) when the policy environment is conducive.

Proponents of contract farming argue that it links small-scale farmers to lucrative markets and solves a number of problems small-scale farmers face in diversifying into high-value commodities. Opponents argue that the imbalance in power between the buyer (often a large agribusiness company) and the farmer leads to an agreement unfavorable to the farmer. Also, they argue that small farmers are often excluded from contract farming schemes, resulting in greater income inequality and social tensions in rural areas.

A large majority of empirical studies suggest that contract farming schemes raise the income of farmers participating in the schemes. The evidence is less clear on the degree to which buyers are willing to contract with small-scale farmers—the answer depends on the commodity, the market, and the policy environment.

Contract farming can be promoted with a favorable investment climate, deregulation of direct transactions between companies and farms, the development of grades and standards, facilitation of farmer organizations to link farmers and firms, cooperation with private firms on provision of extension services, provision of mediation services, and exploration of innovative ways to enforce contracts.

Contract farming cannot serve as a broad-based strategy for rural development because it only makes economic sense for certain commodities in certain markets. On the other hand, in those circumstances, it can be an effective institution for helping small farmers raise their productivity and orient their production toward more remunerative commodities and markets.
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1. INTRODUCTION

Small farmers in sub-Saharan Africa, like those in other 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 whose market demand is growing significantly. Second, even with sufficient information about profitable investments, small farmers often lack the necessary financial reserves to invest in new crops, and their access to credit is limited by the lack of collateral. This constrains their ability to make even profitable investments in tree crops or other crops that have expensive input requirements. Third, small farmers operating near subsistence are understandably more risk averse than larger farmers. They often prefer to assure themselves 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 prior 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).

Large-scale farming also “solves” these problems in that 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. As a result, large-scale agriculture is competitive in many African countries for only a few crops, such as sugarcane. Studies suggest that large-scale agriculture has become prominent in Kenya, Zimbabwe, and South Africa largely because of policy distortions which favored larger farmers (see Deininger and Binswanger, 1995). Thus, contract farming is 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 incentive structures).

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 in developing countries, 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 (Gulati et al. 2006).

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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 sub-Saharan African countries, this definition correspond to farms of 3-5 hectares or less.
However, the impact of contract farming is the 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, effectively paying them less than the minimum wage and “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, with particular emphasis on sub-Saharan Africa. More specifically, this paper has four objectives:

- to describe the economic rationale for contract farming as a way to organize agricultural production,
- to describe 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-scale farmers in sub-Saharan Africa, and
- to draw some conclusions and policy implications to promote contract farming as part of an efficient and equitable system of agricultural market institutions.

Section 2 examines 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. Section 3 describes the conditions under which contract farming is likely to emerge, based on the type of buyer, the type of commodity, and the policy environment. In Section 4, we 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-scale farmers will be incorporated into contract farming schemes. Finally, Section 5 summarizes the findings and identifies some policy implications.

### 2. 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 the 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 maize-milling company in the capital city needs to know what kind of maize will be available for purchase, where to buy it, when it will be harvested, 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.

#### 2.1 Economics of vertical coordination

The most useful way to analyze vertical coordination is with the new institutional economics (NIE). Traditional neoclassical economics generally assumes that there already is a set of market institutions, defined here as the laws, codes, and social norms that define acceptable
behavior. In addition, it generally assumes that economic agents have complete information and that transactions are cost-less. In contrast, NIE looks specifically at the factors that shape the design of economic institutions. It is based on the view that market institutions evolve to reduce costs and adapt to the specific problems associated with each sector (Grosh 1994).

One branch of NIE, transaction cost economics (TCE), 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 (Williamson 2000). The costs of carrying out a transaction can be considerable and is exacerbated by four problems:

- Imperfect information: The buyer and seller never have all the relevant information they need to finalize a transaction. Because of imperfect information, sellers must spend time finding potential buyers and negotiating over the price. Often the seller has more information about the quality of the product, but the buyer has better information about the market demand. This information asymmetry prevents markets from operating efficiently.

- 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, a problem sometimes called bounded rationality.

- 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. This is referred to as the risk of opportunistic behavior.

- Transaction-specific investments: The risks of opportunistic behavior are even greater when the buyer or seller must make investments that are only useful for carrying out a transaction with the other party. This is called asset specificity (Williamson, 1983). For example, to grow coffee, farmers must invest in planting coffee trees, which take four to five years to begin producing. After farmers make the investment, their negotiating position is seriously weakened and the buyer may be tempted to lower the price, particularly if there are no other buyers in the area. Realizing this, farmers are understandably reluctant to make the investment in the first place. Because of this problem of asset specificity, farmers may not be willing to invest in producing a commodity, even if there is a price at which both farmers and processors earn profits.

Although these are often presented as problems for the farmer, they affect traders and processors who purchase agricultural commodities as well. Because of the risk of opportunistic behavior, buyers cannot trust sellers to describe the quality and quantity of their product and are often forced to physically inspect it before purchase. Asset specificity may be an issue for the buyer as well. If a processing plant is designed to handle just one commodity, the processor is “locked” into that sector and depends on a steady supply of the raw material. If there are only a few suppliers and the buyer is concerned about collusion among them, the incentive to invest in the processing plant will be reduced. This problem is probably less severe for buyers than for farmers, however, because there are often many suppliers, making collusion difficult. As discussed later, this may be an important incentive for processors to work with a large number of smaller farmers rather than a small number of large farmers.
Formal and informal economic institutions are designed to address these problems by facilitating communications, disseminating information, developing trust, and punishing dishonest behavior. For example:

- Farmers and buyers often develop a relationship characterized by repeated transactions. This raises the level of trust in individual transactions, but it also limits competition in agricultural marketing and may give the buyer market power.

- Informal codes of conduct serve to outline acceptable behavior in transactions.

- Grades and standards are used to define quality and facilitate negotiations;

- Trade associations and better business bureaus help to discourage dishonesty by establishing codes of conduct and by identifying and exposing firms that use unscrupulous practices;

- Credit bureaus reduce the risk faced by lenders and discourage discretionary default\(^2\);

- In principle, the legal system helps to enforce contracts and limit opportunistic behavior by defining rules and punishing those that break them. In practice, however, farmers and traders rarely resort to the courts to resolve disputes because of the time and expense.

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. And within developing countries, the issues of transaction costs are particularly relevant in the agricultural sector because of the perishability of the product, the geographic dispersion of agricultural production, and farmers’ limited resources and access to information. As discussed in the next section, transactions costs also help to explain the types of vertical coordination in the markets for different agricultural commodities.

### 2.2 Types of vertical coordination in the agricultural sector

Often farmers sell in spot markets, involving transactions between buyers and sellers that involve no 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. For example, Kenyan farmers learn that maize prices are higher in Nairobi than in the local market, higher in the off-season than during the harvest, and higher when the maize is clean and dry. Based on this information and estimates about the cost of changing the timing, location, and quality of the maize sales, they decide on a marketing plan. Similarly, traders learn how prices vary according to month, location, and quality and adjust their procurement strategy accordingly. If the commodity is non-perishable, 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

\(^2\) Discretionary default refers to the situation when a borrower decides not to repay a loan even though he has the financial means to do so.
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 local consumption.

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 the buyer with regard to 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, humidity 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. In order for contract farming to be worthwhile to both parties, the gains from reducing transaction costs must exceed the costs of establishing the contract. In Section 3, we discuss the conditions under which the benefits are likely to exceed the costs, making contract farming an appropriate form of vertical coordination.

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 farm workers. Clearly, the company has more control over how the product is grown and harvested when it owns the land and hires the labor, but there are disadvantages as well. For example, farm workers are paid by the day, so they are less motivated than independent farmers and require closer supervision. In addition, it is more difficult and 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 systems. 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 (see Coulter et al, 2000). Non-governmental 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 (see Bolwig et al 2009, IFAD 2003, and Narrod et al 2009). And some forms of contract farming involve processor assistance in planting, spraying, and harvesting, reducing the role of the farmer to the provision of land and labor and blurring the line between contract farming and vertically-integrated production. This is often the case in contract production of sugarcane (Minot 1986, Kirsten and Sartorius, 2002).

In addition, a common pattern is to combine vertical integration and contracting. In this case, the processor grows some of the raw material on a plantation run by the company, called a nucleus estate. In addition, the processor contracts farmers (or outgrowers) to supply the rest of the raw material. This type of arrangement is common in the case of sugarcane, oil palm, rubber, and other crops which can be grown economically on a large-scale. The nucleus estate ensures a minimum output at a low cost, while that contract growers allow for more flexibility in production and may contribute to good-will from the community and/or the government.
2.3 Types of contract farming

There are numerous ways to classify contract farming schemes. Here, we describe three of the more common ones. 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. This type of contract is more common when the buyer is a trader purchasing vegetables to resell on the wholesale market. At the other extreme, the contract is a formal written document that specifies input use, production methods, minimum quality standards, and price at which it will be purchased. Formal contracts are more commonly offered by large processing firms, particularly when purchasing from medium- to large-scale farmers. In a study of contract farming in five African countries, Dansson et al (2005) states that formal contracts are more common in Kenya and South Africa, while informal contracts are the norm in Ghana, Nigeria, and Uganda.

Second, contract farming schemes can be classified by the types of commitments made in the contract 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. This type of contract makes sense when market coordination is needed, but the farmer does not need assistance in obtaining inputs and the buyer is not concerned about production methods, other than the product quality that can be measured at harvest. This type of contract may be informal or formal.

- In a resource-providing contract, the buyer also provides agricultural inputs and technical assistance on credit. This type of contract is appropriate when the buyer has better access to credit and specialized inputs that are needed for production than farmers do. Resource providing contracts are more likely to be formal because of the need to specify the terms of the input credit.

- The third type is the production-management contract, which specify the manner in which the commodity is to be grown, such as the planting density, use of pesticides, and timing of harvest. This type of contract makes sense when the buyer has more information about production methods or wants to ensure a level of quality or food safety. For example, the buyer may specify the types of pesticides that can be used and the timing of their application to ensure that pesticide residue standards are met. This type of contract is more likely to be a formal written document in order to describe the desired production methods.

In practice, however, many contracts combine elements of these 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. There are three main methods, with some variation within each.

- Fixed-price contracts - In some case, the price is fixed at planting time by the buyer. This has the advantage of reducing the risk to farmers, but it also leads to problems if the market price at harvest time diverges too much from the fixed price. If the market
price is higher, it may lead to side-selling, in which farmers violate 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.

- Formula-price contracts - To avoid problems of side-selling, contract farming schemes sometimes rely on formula pricing, in which the buyer agrees to pay a price which is based on a market price, usually the market price plus a percentage premium. Farmers have less certainty about the returns to producing the crop, but the formula ensures that they will be at least as well off as if they had produced for the market.

- Split-payment contracts – In this system, the buyer makes two or more payments to the farmer. The first payment is usually a fixed price determined before planting, while the amount of the second payment varies depending on the sales price realized by the buyer. This system is often used by processor-exporters in the case of cotton and other export crops.

3. 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.

3.1 Type of buyer

What types of buyers are more likely to organize a contract farming scheme? 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 do 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. For example, the profitability of a sugar mill is dependent on having a steady flow of sugarcane over the year, including supplies before and after the peak harvest season. Sugar mills often use contract farming to stagger production over the season and increase their annual volumes. In addition, because sugarcane is bulky and perishable, it cannot be transported far, and sugar mills often purchase a large share of the cane available in a given area (Sartorius and Kirsten, 2004).
3.2 Type of agricultural commodity

What types of agricultural commodities are more likely to be produced using contract farming? 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 spot markets will be more efficient. These factors explain why spot markets are the standard form of vertical coordination between farmer 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 investment 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—A given percentage premium for higher quality is more likely to cover the incremental cost of contracting if it is a high-value commodity.

- High 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 relationship that ensures a fixed price or at least 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. Farmers in developing countries may not have the liquidity to purchase inputs at planting time, so the contract allows the buyer to provide inputs on credit and to recover the cost by deducting it from the payment to farmers at harvest.

These factors imply that vertical coordination is needed for high-quality fruits and vegetables, organic products, spices, flowers, tea, tobacco, seed crops, and other quality-sensitive and perishable commodities. In dairy production, the high degree of perishability and the importance of quality encourage vertical coordination, including contract production and dairy cooperatives. Dairy cooperatives can be considered a form of vertical integration in that farmers jointly purchase and manage processing facilities. Medium- and large-scale poultry production is often organized in a contract farming arrangement, in which the processor provides chicks, feed, and medicine to contract farmers and takes the chickens at the end of the growing cycle. Poultry contracts are quite detailed, specifying many detailed aspects of the production process. The processor retains legal ownership of the chickens, so the relationship is almost like home-based piecework, in which the grower provides labor and the production site and is paid based on the number of units produced. Part of the rationale for
poultry contracting is that the processor is providing specialized inputs and production methods on credit. In Thailand, for example, virtually all commercially produced broilers are produced under contract, whereas the corresponding figure for the Philippines is 80 percent (Delgado et al. 2003).

An alternative to contract farming is vertical integration, in which the buyer owns farmland and engages in direct production of the commodity. In the choice between contracting and vertical integration, an important factor is *scale complementarity*, that 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. This is the case with sugarcane and high-quality bananas and pineapples, for which large-scale production is generally less costly. For example, pest control in banana production often involves aerial spraying, which implies economies of scale (Minot 1986).

Similarly, if both production and processing can be done on a relatively small scale, then vertical integration is feasible. But 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 its raw materials from independent farmers.

In some countries, it is not possible to purchase or lease large plots of land, preventing processors from vertically integrating into production and forcing them to rely on contract production. In Kenya, Del Monte used to contract with medium-scale farmers to grow pineapples, but when the government made long-term land leases available at concessionary rates, the firm switched from contract production to plantation production (Minot and Ngigi 2004). Vertical integration has the advantage of tight control over production decisions, but the disadvantages of inflexible productive capacity and high costs of supervising day-wage laborers who are less motivated than small-scale farmers.

### 3.3 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 more incentive there is 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 upscale 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 on vertically integrated orchards/packing houses, whereas apples for sale to urban supermarkets are often grown under contract, while apples for local consumption are sold by farmers 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. Processors and exporters often establish contract farming schemes to procure organic products, partly to ensure that organic methods are in fact used. In some cases, particularly in developing countries, buyers may contract with farmers as a way of assisting them with organic food
production methods. The profitability of organic food production depends, of course, on consumers’ willingness to pay a premium that covers both the additional cost of production (due to lower yields) and the cost of monitoring and certifying. For example, although rice is rarely grown under contract, organic rice production is often organized under a contract farming scheme (Setboonsarng et al. 2006). Similarly, although smallholder coffee is often grown without contracts, Bolwig et al (2009) describes the use of contracts with small-scale farmers to grow organic coffee.

A third example is seed production. Seeds must be grown under carefully monitored conditions to minimize the risk of seed-borne diseases, mixture of weed seed, or mixture with other varieties of the same crop. This process involves starting with healthy seed that is varyetally pure, monitoring the field closely, controlling weeds effectively, and isolating fields from fields with other varieties, all of which add to production costs. Sometimes seed companies use their own fields (vertical integration), particularly for early generations of seed multiplication. But they typically use contract farmers, particularly for the later generations, 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 et al. 2005).

4. EXPERIENCE WITH CONTRACT FARMING

Previous sections have examined the economic rationale for contract farming and the conditions under which it is likely to be an appropriate form of vertical coordination. In this section, we look at the experience of contract farming. First, we discuss the patterns of contract farming in sub-Saharan Africa. Second, we review studies that attempt to assess the impact of contract farming schemes on farmers who participate. And third, we summarize studies that provide information on the types of farmers that participate in contract farming schemes, particularly on whether poor farmers can benefit from contract farming.

4.1 Patterns in contract farming in Africa

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. For this reasons, it is convenient to organize the discussion of patterns of contract farming by commodity. 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 traditional market channels (assembler-wholesaler-retailer) without contractual agreements. However, horticultural production for export often requires specific requirements in terms of quality, quantity, timing, or production methods which can only be met through a contractual relationship. Similarly, processors that produce (for example) tomato paste and fruit juice often contract the production of their raw materials in order to ensure that quality standards are met and to stagger production.
Kenya is the second-largest exporter of fruits and vegetables in sub-Saharan Africa (after South Africa), with exports of US$ 450 million in 2008. Canned pineapple, green beans, and fruit juice are Kenya’s main exports in this category, but they account for less than one-third of the total value (FAO, 2011b). While South African horticultural exports are based mainly on large-scale production, Kenya has a significant small-scale horticultural export sector. Jaffee (2003) estimates that smallholders account for 27 percent of exported fresh vegetables and 85 percent of exported fresh fruit, for an average of 47 percent of fresh fruit and vegetable exports. Most horticultural exporters rely to some degree on small-scale contract growers, but this is particularly common for exports of French beans. Often farmers organize themselves into self-help groups in hopes of obtaining a contract with an exporter. Farmers with irrigation who can ensure a year-round supply of vegetables are much more likely to get a contract, as are those living on main roads within a few hours of Nairobi (Minot and Ngigi, 2010).

Although the Kenya experience demonstrates the potential for using contract farming to link small farmers with demanding export markets, the history of contracting in Kenya also illustrates the instability of these markets. Since contracting small farmers began in the 1940s, there have been numerous cases of schemes that have been launched, flourished, and later failed, often because of changing demand or side-selling. In addition, the commodities being exported (and therefore contracted) have changed as Kenya gained or lost competitive advantage relative to other suppliers. Finally, the role of smallholders changes over time, with some arguing that rising standards for quality and food safety may threaten the role of smallholders in horticultural export production (Minot and Ngigi, 2010; Narrod et al, 2009).

Ethiopia is the fifth largest exporter of fruits and vegetables in sub-Saharan Africa, earning more than US$ 200 million in 2008 (FAO, 2011b). One exporter, the Ethiopia Horticultural Producer Exporter Association (EHPEA), has 300 member farmers that produce 300 tons of vegetables under contract for export. Another company, EthioFlora, produces several hundred tons of green beans under contract for export. The company started using their own land for production, but as demand increased, it was forced to contract production in order to scale up. A third Ethiopian company, AfricaFruit, is investing in passion fruit scheme which will involve 50% own production and 50% contract production (Melese, 2010).

In Malawi, five companies are collecting and exporting paprika, two of which use contract production. Farmers are given seed and technical assistance, the cost of which is deducted from payments at harvest. It is estimated that about 60,000 small-scale farmers grow paprika under contract in Malawi. In addition, close to 6000 farmers grow chilies under contract in Malawi (Kumwenda and Madola, 2005).

During the 1990s, Zimbabwe was a successful exporter of flowers and off-season vegetables, including asparagus, babycorn, mangetout, sweet corn, and chilies. Exports of fresh produce and flowers reached US$ 60 million in 1999. Most of this was produced by the large-scale commercial farm sector, but about 10% was supplied by small-scale farmers working under contract. Hortico, one of the main horticultural exporters, works with more than 4000 small-scale contract growers. It provides inputs and technical assistance, as well as mandating the size of the horticultural plots, and deducts costs from the payment at harvest. A minimum price is specified, though the payment may be higher if market conditions allow. Interestingly, this arrangement is without a written contract, based on the idea that it would be unenforceable in any case (Masakure and Henson, 2005).
In Madagascar, an estimated 10,000 small-scale farmers grow French beans and other vegetables under contract to exporters who sell to supermarket chains in Europe. Exporters provide inputs, extension services, and close supervision of production to meet the strict standards imposed by the supermarkets. A survey of contract growers revealed that the average farm size was similar to that of other farmers, but contract growers tended to be more education. Furthermore, contract farmers have higher welfare and more stable income than those non-participating in the schemes (Minten et al, 2009).

Senegal produces fresh fruits and vegetables for export to the European Union. Maertens and Swinnen (2007) estimate that almost 1000 farmers were involved in contract production of French beans for export in 2005. They find that tightening quality standards in Europe caused a shift from contract production to vertically integrated production in which exporters own large-scale estates and used hired labor to grow vegetables. They find that households involved in export production, either as contract farmers or as estate workers, have significantly higher income than those not working in the export sector. Furthermore, the additional income is higher for contract farmers than for estate workers. And yet, somewhat surprisingly, the poverty impact of large-scale production is more positive because households involved in agricultural labor in the region are initially more likely to be poor than small-scale farmers, so the incremental income is more likely to lift them out of poverty.

Tea

Tea is produced on both large-scale plantations and by small-scale farmers. The total value of tea exports in 2008 was US$ 1.2 billion. Kenya is by far the largest exporter on the continent, earning US$ 930 million, followed by Rwanda, Uganda, Tanzania, and Malawi (FAO, 2011b).

About 60% of Kenyan tea production is supplied by the Kenya Tea Development Agency (KTDA), which operates one of the largest contract farming schemes in the world. It was formed as the Kenya Tea Development Authority in 1964 as a parastatal enterprise with the mandate to manage the 19 thousand small-scale tea growers in the country. By providing technical assistance, planting materials, and inputs on credit, the KTDA facilitated growth in the number of contract farmers. In 2000, the KTDA was converted into a private enterprise owned by the tea factories, which are in turn owned by the small-scale tea growers, whose numbers had increased to 200,000. By 2009, the KTDA had 54 tea factories and 562 thousand tea growers. The average tea area on member farms is just 0.2 hectares, implying that tea provides supplemental cash income to households but they are by no means specialized tea producers. The KTDA continues to provide extension services and inputs on credit, deducting the costs at the time of sale, and processing and exporting the tea (Mbadi, 2010).

Malawi is among the top six African exporters, and in some years (e.g. 2007) it is the second largest exporter. Small-scale production is managed by the Smallholder Tea Authority, a parastatal formed in the 1960s. As of 2005, the STA contracted about 8000 small farmers, providing them with free seedlings, technical assistance, and inputs on credit. The STA offers one payment at harvest and another payment after the tea has been auctioned, the amount being determined by the auction price (Kumwenda and Madola, 2005). However, smallholders account for just 15% of the area and 7% of the production of tea in Malawi (Eldring, 2003).
Coffee

Coffee exports from sub-Saharan Africa were worth more than US$ 2 billion in 2008. Ethiopia is the leading exporter, with more than US$ 500 million in sales in 2008, followed by Uganda, Kenya, Cote d’Ivoire, and Tanzania, each of which exported more than US$100 million per year (FAO, 2011b). Small-scale farmers account for almost all the coffee production in Africa.

As with other traditional export crops, the marketing system for coffee has changed significantly since 1990. Economic reforms liberalized export marketing, abolishing the monopoly of state-owned enterprises in the marketing and export of coffee (Kherallah et al, 2003; Akiyama, 2001). Although private firms now play a major role in processing and exporting coffee, they generally do not engage in contract farming, narrowly defined. Instead, farmers sell to private traders on the spot market or they sell their output through coffee cooperatives. The role of the coffee cooperatives is sometimes similar to that of a contracting processor, but often it is merely a buyer.

The reason formal contracting is not common in coffee marketing is related to the characteristics of the processing and the product. There are two methods for processing coffee: dry processing of coffee involves drying the berries, usually in the sun, and then hulling them to remove the pericarp, while wet processing involves pulping the berries to remove the pericarp, then fermenting and washing them to remove the fleshy coating on the beans, and drying and cleaning them (Musebe et al, 2007). Drying can be done at the farm level, pulping requires a small machine, and washing stations are of a scale that can be managed by a small cooperative. Furthermore, once dried, the coffee beans can be stored at the farm level for up to a year. Because of the relatively small economies of scale in coffee processing and non-perishability of the beans, there is no large-scale processor with the means and motive to coordinate supply with contracts.

In a survey of coffee farmers in Ethiopia, Musebe et al (2007) reports that most coffee (71%) is dry-processed, while the remainder is wet-processed. Wet-processing is more involved but produces a higher quality bean and a higher price. Farmers using wet processing tended to have more coffee production, be more educated, and be located closer to a washing station. In another study of Ethiopian coffee marketing, Tilahun (2006) found that farmers sold both dried cherries and red (unprocessed) cherries. The red cherries were sold immediately after harvest, usually to the cooperative, while the dried cherries were often sold months later and almost always to private traders. The cooperatives were not providing fertilizer or credit to members, serving only to process and market a portion of the coffee harvest.

Uganda is the second-largest coffee exporter in Africa, with export revenue of US$ 370 million. In the early 1990s, the state-owned Coffee Marketing Board was reorganized and opened up to competition from private exporters. The number of exporters rose quickly, leading to competition and better prices for farmers. In order to procure coffee, exporters integrated backward into hulling facilities and buying stations in rural areas. Some coffee is still marketing through cooperatives, but the market share of cooperatives has declined with liberalization (Akiyama, 2001; Dannson et al, 2004.). Some exporters have tried to distinguish their product by seeking certification as organic, Fair Trade, or UTZ certified. This involves direct involvement with farmers in training and supervising production, as well as offering a premium price. This constitutes a form of contract farming, though it may be somewhat informal. Bolwig et al (2009) describe the case of the largest exporter of organic...
coffee, which contracts with almost 4000 coffee growers in eastern Uganda. It offers a premium price to farmers, although the amount is not specified before the harvest. Although these arrangements are likely to grow, they still account for a small portion of 350 thousand small-scale coffee growers in Uganda.

Rwandan coffee exports in 2008 were about US$ 55 million (FAO, 2011b). A census of coffee growers in 2009 revealed that there were close to 400 thousand coffee growers with an average of just 183 trees per farm. Since typical planting densities are 2000 trees/ha, this implies that coffee production in Rwanda is carried out on very small plots. About half the trees are treated with pesticides and a similar number are mulched, but fertilizer use is very low. Only 20% of coffee growers in Rwanda belong to a cooperative (OCIR-Café, 2011a). The government body managing coffee development, OCIR-Café, plays a number of roles in the coffee sector, including announcing minimum prices and distributing fungicide and fertilizer. It is also promoting private investment in coffee washing stations in order to improve quality (OCIR-Café, 2011b).

**Tobacco**

Sub-Saharan Africa exported US$ 1.4 billion worth of tobacco in 2008. About 80% of this was exported by four countries: Malawi, Zimbabwe, Tanzania, and Mozambique (FAO, 2011b). The two main types of tobacco are burley and flue-cured Virginia tobacco, the main difference being that burley is simply dried after harvest, while Virginia tobacco is cured with heat for about a week, requiring special curing facilities and firewood. Burley tobacco 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-scale farmers. Virginia tobacco has higher economies of scale because of the need for flue-curing facilities (Agar and Chilgo, 2008).

Malawi is the largest tobacco exporter in sub-Saharan Africa, with exports worth US$ 590 million in 2008. In the 1960s and 1970s, tobacco production was tightly controlled by a system of production quotas under which only selected large-scale estate producers were allowed to participate in the lucrative sector. In the 1980s, the quota system was relaxed to allow some 30,000 “mini-estates” of 10-20 hectares to produce tobacco, but the bulk of the rural population was excluded. In 1993, as part of a series of economic reforms, tobacco exports were liberalized to allow small-holders to grow and market tobacco. An estimated 200,000 smallholders adopted Burley tobacco production for export, which resulted in documented increases in smallholder income and even spillover into higher maize yields because of tobacco income facilitated fertilizer purchases. Contract farming, however, was made impossible by the requirement that tobacco be sold on the auction floor. (Orr, 2000; Jaffee, 2003).

Since 2005, a separate section of the auction floor has been allocated for “direct marketing,” meaning sales to a single (contract) buyer. In 2007-08, the law allowed no more than 33% of the tobacco to be sold in this way. Two large buyers (Limbe Leaf and Alliance One) have established contracts with groups of ten tobacco farmers. The groups reduce the cost of distributing inputs and technical assistance and the members take group responsibility for the loans they receive. About 95% of the tobacco is purchased from these farmer groups at pre-arranged prices, but with no provision of inputs on credit, while 5% include the provision of inputs on credit. For these farmers, production is closely monitored and inputs are provided
when needed, leading to higher yields than non-contract farmers. Although the scheme is relatively new, both farmers and buyers appear to be satisfied with the results (Agar and Chilgo, 2008).

Sugarcane

The largest sugarcane producers in sub-Saharan Africa are South Africa, Sudan, Kenya, and Swaziland, which account for almost half the total production in the region (FAO, 2011a). The cane is processed into sugar and other products for both the domestic market and for export. Only about one quarter of the sugar produced in sub-Saharan Africa is exported. The largest exporters are Mauritius, South Africa, Swaziland, and Ghana, each of which earn more than US$ 100 million per year from sugar exports. These four countries account for about two-thirds of the US$ 1.2 billion in sugar export revenue earned by countries in the region (FAO, 2011b).

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. Since there are some economies of scale in production, particularly when harvesting is mechanized, the two dominant forms of vertical coordination in sugar production are vertical integration (where the mill and sugar plantation are owned by one company) and contract farming. In developing countries, these two forms are often combined in the form of a nucleus-estate with outgrowers. Typically, the processor provides assistance with land preparation, technical assistance, inputs, and harvesting, so that the contribution of the contract farmers is modest (Minot, 1986; Baumann, 2000; Sartorius and Kirsten, 2004).

In an early study of sugar contracting in Africa, Kennedy and Cogill (1987) examined the effect on the income and nutritional status of contract growers in the Mumias sugar scheme in western Kenya. They concluded that participation in the scheme raised household income, but also contributed to some negative social impact. Because the payments were made to the men in the household in lump sums, there were problems with alcoholism and other misuse of the revenue, and poor nutritional outcomes. One explanation of this outcome is that, in contrast to other contract farming schemes, contract sugar production often occupies most or all of the land owned by the household, so that food consumption is highly dependent on purchases from the sugar revenue.

Porter and Phillips-Howard (1997) describe several contract farming schemes for sugar in South Africa and Malawi. Although much of the work in sugarcane production was carried out by women, the payments were made to the men, based on the fact that they legally owned the land. The authors recommend more land be allocated to food production on each farm, that contacts be signed with women when they do the bulk of the work, and that contractors be organized to negotiate for higher cane prices.

Sartorius and Kirsten (2004) examine the contract production of sugarcane in South Africa and Swaziland. The sugar sector plays an important role in both countries, but particularly in Swaziland, where it accounts for 60% of the agricultural gross domestic product. In spite of

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3 This calculation is based on 2008 sugarcane production and sugar export figures, and assumes a sugarcane-sugar conversion ratio of 12%.
the South African government’s interest in helping small-scale farmers participate in commercial agriculture, they are largely excluded in practice because of difficulty in achieving the scale and quality required by. The authors compare the efficiency of small-scale contract production and large-scale estate production. Although small-scale farmers achieve similar yields and sucrose content in production, they incur larger costs in the distribution of inputs, technical assistance, and delivery of cane to the mill. They also find that small-scale growers in Swaziland are more efficient than their counterparts in South Africa, perhaps related to their greater experience in growing sugarcane.

Agar and Chiligo (2008) describe sugar contracting in Malawi. There is one company which operates two nucleus estates, each with several hundred contract farmers. The average area planted to sugarcane is about 3 hectares, suggesting that many of the contract farmers are medium-scale farmers in the Malawian context. The contract growers are all located within 30 kilometers of the processing plant and must deliver the cane within 36 hours of harvesting. They are paid a price based on a formula, which is 60% of the value of the sugar which can be extracted from their cane. Although there are conflicts between farmers and the company regarding the method of estimating the sugar content of the cane, the satisfaction level among sugar contractors is relatively high, and the turnover among contractors is small.

Cotton

Cotton is grown in 33 countries of sub-Saharan Africa, but the largest producers are Burkina Faso, Nigeria, Tanzania, Benin, Mozambique, Zimbabwe, and Mali, each of which harvested more than 200 thousand tons of seed cotton in 2008. The seed cotton is processed into cotton lint, cotton seed oil, cotton oil cake (for animal feed), and other by-products. Some cotton lint is used for domestic textile industries, but about 70% of the lint is exported. Cotton exports from sub-Saharan African countries were worth US$ 1.2 billion in 2008. The leading exporters were Mali, Burkina Faso, Benin, Tanzania, and Zimbabwe, each of which had export revenues of more than US$ 100 million in 2008 (FAO, 2011b).

During the 1970s and 1980s, cotton production and marketing in Africa was managed by state-owned enterprises. The enterprises typically provided cotton seed, fertilizer, and extension services to farmers on credit. At harvest, it would organize the collection of the seed cotton from farmers, paying a government-set price and deducting the cost of the inputs. The cotton enterprise also monopolized the cotton ginning, marketing, and exports. This system resembles a contract farming scheme, except that the operation was not fully commercial. In years when the world cotton price was high, the cotton sector was implicitly taxed, while low cotton prices would force the government to subsidize the farm-gate price (Baffes, 2001; Kherallah et al, 2003).

Although reasonably successful at providing inputs to small-scale farmers and expanding output, the lack of competition led to growing inefficiencies, manifested in high marketing costs and low producer prices. In addition, the lack of transparency led to rent-seeking and corruption. When world cotton prices fell in the late 1980s and early 1990s, a number of the state enterprises entered de facto bankruptcy. During the 1980s and 1990s, economic reforms led to the liberalization cotton markets and attempts to privatize the cotton enterprises. The liberalization process has been slow, particularly in West Africa, because of the economic

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4 This estimate is based on FAO statistics for seed cotton production and cotton lint exports, combined with an assumed 33% conversion from seed cotton to lint.
importance of the cotton sector, political resistance, and questions about how to maintain the input delivery system in a liberalized market (Baïfès, 2001; Gergley and Poulton, 2009).

Currently, cotton is grown under a variety of institutional forms. In Mali, Cameroon, Senegal, and Chad, the system of a state enterprise with a legal monopoly on cotton marketing and exports remains. This state-managed system resembles contract farming in that farmers are provided with inputs on credit, to be repaid at harvest. In Mozambique, Cote d’Ivoire, Ghana, and Burkina Faso, 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. Occasional credit crises in which repayment rates fall sharply still occur, however. In other countries, such as Zambia and Zimbabwe, the cotton sector has been liberalized, but it is dominated by a small number of companies. The small number of firms makes contracting and the provision of credit possible. Almost all cotton farmers in the countries mentioned receive seed and fertilizer on credit and are contracted to sell their cotton to the company providing the inputs. In Tanzania, however, there are more than 30 private companies competing with each other, making it easy for farmers to side-sell and avoid repaying their input credit. The provision of inputs on credit collapsed soon after the cotton market was liberalized, so that input purchases and cotton marketing take place through cash transactions without contracts. Uganda had a hybrid system in which zones were created and only 2-3 gins were allowed to compete within each zone. Because this system did not seem to improve quality or stimulate contracting, the zone system was recently abandoned (Tscherl et al., 2009a and 2009b).

The experience of cotton suggest that there is a trade-off between competitive markets and vertical coordination through contracts. In competitive markets, farmers receive a good price for the seed cotton, but the option of side-selling reduces the ability of the companies to ensure repayment, which in turn makes it unlikely they will offer inputs on credit and technical assistance through a contract farming scheme.

Other crops

In addition to the crops described above, contract farming is used in the case of other commodities:

- 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.
- Grains for large-scale breweries. Large-scale brewers need a steady supply of sorghum, maize, and/or barley. In addition, they may require a variety that is different than what farmers would grow for the local market or for home consumption. In this case, contracting helps coordinate farmer supply to meet processor demand.
- Poultry: Although not widely documented in sub-Saharan Africa, commercial poultry production is often carried out on a contract basis. Large poultry or feed companies contract medium-sized farmers, providing them with chicks, feed, and technical assistance and buying the broilers when they reach maturity (Ramaswami et al., 2006).
- Rubber: Contract production of rubber in Malaysia represents one of the largest schemes in the world, with more than 100 thousand farm households. On a smaller scale, contract
farming is also used to produce rubber in western and central Africa. Côte d’Ivoire is by far the largest rubber exporter in Africa, with revenues of US$ 494 million in 2008 (FAO, 2011b). 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; Bruntrup and Peltzer, 2007).

- Oil palm: Similar to rubber production, oil palm production is concentrated in western and central Africa and is often grown on nucleus estates with outgrowers. The largest exporters in sub-Saharan Africa in 2008 were Benin, Côte d’Ivoire, and Ghana (FAO, 2011b). Newer high-yielding varieties respond well to weed control and regular maintenance, shifting the advantage from smallholders to estate production (Baumann, 2000).

This section shows 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. This raises the question: what proportion of African farmers are participating in a contract farming scheme. Bruntrup and Peltzer (2007) estimate that contract farmers represent 30-40% of the farmers in Burkina Faso, Zambia, and Kenya and 33-43% of farmers in Cameroon. These estimates may be misleadingly high for three reasons. First, they include “members of large cooperatives”, which do not necessarily (or even often) contract output and provide inputs on credit. Second, they appear to be counting farmers who grow several crops that are rarely produced under contract, such as maize and rice. Third, if they added up the number of farmers growing contract crops, they would have double-count farmers growing more than one of them.

In the cotton growing countries of western Africa, the proportion of farmers involved in some form of contract farming (including government-managed schemes) may be relatively high. In Benin, one of the countries most dependent on cotton production, barely one-third of the farmers grow cotton and are, thus, involved in contract production (Minot and Daniels, 2005). In Kenya, the proportion is likely to be at least 25% because of the large number of contract producers of tea and vegetables. However, most inventories of contract farming schemes in individual countries identify only 4-8 schemes, each of which have between several hundred and several thousand contract farmers (see Dansson et al. 2004). Given that most African 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 less than 5%.

4.2 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. Furthermore, if the contract farming scheme involves tree crops or other transaction-specific investments, farmers may be “locked into” an arrangement that is not beneficial. And finally, contract farming may bring benefits to the farmers who make the decision, but have negative effects on the community or even on other members of the household. For this reason, it is worth examining the empirical evidence regarding the impact of contract farming.
Research on contract farming is fairly extensive. In a seminar report, Mighell and Jones (1963) explore the rationale for contract farming and discuss the patterns of contracting in the United States. In the an early review of the literature, Minot (1986) finds 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.

Little and Watts (1994) provide a more skeptical view of the benefits of contract farming. They compile a set of seven case studies of contract farming in Sub-Saharan Africa. The case studies focus on the historical and political context of contract farming, conflicts between farmers and the contracting firms, the imbalance of power between the two parties, intra-household tensions over the division of labor and the allocation of new revenues, and the increasing rural inequality as contract farmers grow wealthy enough to hire farm laborers. In his summary of the cases, Little (1994, 221) concludes that “incomes from contract farming increased for a moderate (30–40 percent) to a high (50–60 percent) proportion of participants.” This income was not enough to live on, however, and farmers had to rely on other farm and nonfarm income. In several cases, households lost land that was appropriated for government-run contract farming schemes.

In a review of the experience of contract farming in Africa, Porter and Phillips-Howard (1997) conclude that farmer incomes are raised by contract farming, but they focus on social problems that it may cause, including lack of control over production, imbalance of power, income inequality, and intra-household conflict. They also note that contract farming schemes may be established on land appropriated from local communities. They propose a number of policies to limit the adverse affects of contract farming, including protection of property rights and independent mediation in case of disputes.

More recent studies use farm surveys to compare income and other outcome variables for contract farmers and other similar farmers. For example, Warning and Key (2002) study contract production of groundnuts in Senegal. NOVASEN, a private cooking-oil manufacturer, contracted with 32,000 growers and produced approximately 40,000 tons of groundnuts annually. Warning and Key find that the increase in gross agricultural revenues associated with contracting is statistically significant and large, equal to about 55 percent of the average revenue of noncontract farmers. They argue that the leverage of contract farmers is increased by the existence of parallel markets for the groundnuts.

Contract farming is used to produce organic coffee in eastern Uganda. The company contracts close to 4000 coffee farmers, providing technical assistance and organic certification. Bolwig et al (2007) compare farmers in the scheme with a control group, showing that there are positive revenue effects from participating in the scheme, even after controlling for a variety of other factors.

Minten et al (2009) use similar methods to evaluate a contract farming scheme in Madagascar. More than 10,000 small-scale farmers grow vegetables under contract to an exporter. The company provides technical assistance and inputs, while imposing strict quality standards in order to export the produce to Europe. Compared to similar farmers who are not participating in the scheme, the contract growers have higher incomes, more stable income, and a shorter “lean” season. In addition, they find evidence that the scheme contributes to the adoption of new technology and that there is some spillover in terms of higher rice yields.
The experiences of contract farming outside of sub-Saharan Africa is similar. Singh (2002) identifies a series of problems associated with contract vegetable production in the state of Punjab in India: imbalanced power between farmers and companies, violation of the terms of the agreements, social differentiation, and environmental unsustainability. Nonetheless, his surveys reveal that most farmers have seen incomes rise since joining the scheme and are generally satisfied with the contract arrangement.

There is some evidence that contract farming leads to a sharing of risks between the producer and the purchaser. Birthal et al. (2005) show that, in the case of poultry farmers in India, the coefficient of variation (CV) of the profit of contract farmers is lower than the CV of profits of noncontract farmers. Because there was not much variation in yield, price volatility was the main reason for high variability in profits of independent growers.

Birthal et al. (2005) also examine contract production of vegetables and milk in India. They find that vegetable contract farmers received prices that were 8 percent higher than those received by noncontract growers, and contract milk producers received prices that were 4 percent higher. Other things being equal, agro-processors find it more advantageous to deal with a small number of larger suppliers of raw materials than with a large number of smaller suppliers. Working with small farmers, however, often has offsetting advantages. Birthal et al. (2005) observe that firms in India often found it more convenient to contract with smallholders and their associations for several reasons:

- lower risk for overall supply in the event of crop failure of one or few farmers;
- higher quality thanks to labor-intensive management and;
- lower costs due to lower implicit wage rates.

Another study, carried out in Indonesia by Simmons et al. (2005), examined contract growers of poultry, seed maize, and seed rice. The contracts for poultry and seed maize resulted in improved returns to capital, whereas no significant impact was found in the case of seed rice. The authors conclude that the contracts increased income and welfare, reducing absolute poverty.

Ramaswami et al. (2006) studied poultry growers with and without contracts in India. They found that average gross margins were similar between contract growers and others, but the regression analysis indicated significant gains from contracting. The explanation is that contract growers were less experienced and had less access to credit than other growers. Thus, they gained more from the management assistance and the credit provided by the firm than would more capable farmers who already had access to credit. Consequently, the incomes of contract farmers were significantly higher than they would have been without the contract, but only slightly higher than the incomes of the more-skilled independent growers. In addition, the authors also show that the variability of gross margins across production cycles was much lower for contract growers than for independent growers, revealing another benefit of contracting.

Thus, the weight of evidence suggests that successful contract farming schemes generally raise the incomes of farmers who join them. The cases where contract farming does not improve farm income (or at least reduce income volatility) are often short-lived as the scheme collapses.
4.3 Participation of small-scale farmers in contract farming schemes.

Even if farmers benefit from their contractual relations with processors and exporters, there is still the issue of whether small-scale farmers are able to 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. Other things being equal, firms would generally rather work with a small number of larger farmers rather than a large number of small-scale 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. All other factors, however, are not equal. Most important, the family labor used by small-scale farmers has a lower implicit wage rate than the wage laborers hired by medium- and large-scale farmers. In addition, 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.

A number of studies examine the proportion of contract farmers that are smallholders, as an indicator of the pro-poor impact of contracting. Guo et al. (2005) use data from farm-level surveys in China covering several products to estimate the likelihood of participating in a contract farming scheme as a function of household characteristics, crop mix, and farm size. The results show that small farmers are less likely to participate in contract farming than larger farmers.

Key and Runsten (1999) look at contract farming by the tomato-processing industry in Mexico. Multinational agro-processors from the United States 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.

In the study of groundnuts in Senegal cited earlier, Warning and Key (2002) compared contract and independent farmers by various measures of assets. They found that indicators of asset ownership were not significant predictors of participation in the contract farming scheme, suggesting that contractors were typical rural households. In the study of contract farming in Indonesia, Simmons et al. (2005) found that contract seed growers had larger farms than independent growers, but contract poultry producers tended to be smaller than independent poultry growers.

A few studies give examples of buyers shifting from small-scale to large-scale farmers or the reverse. One example, cited in World Bank (2006), is an exporter in Thailand that started producing its own horticultural products on company land and later shifted to smallholder contract production. Minot and Ngigi (2004) 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 (Maartens and Swinnen 2006). These findings confirm that the comparative advantage of smallholders is not a static concept, but it can change as farmers and buyers experiment and learn from experience. One study in Costa Rica found that younger, less experienced growers were more likely to grow under contract (Saenz and
Ruben 2004). The fact that contract farming schemes occasionally switch from large-scale to small-scale farmers suggests that the cost differences between them is small, which implies that public policy may be able to play a role in encouraging the participation of small farmers in these supply chains.

4.4 Challenges facing contract farming

Although numerous studies confirm that contract farmers gain from participation, the studies also show reveal frequent problems in these schemes. In fact, there is a relatively high rate of failure for contract farming schemes in 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; Ngigi and Minot, 2010). Similarly, Sartorius and Kirsten (2004) note “the high level of failure of small-scale farmer contract farming projects in developing countries” (p. 89).

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 either force processors to vertically integrate and produce their own raw materials, to purchase from large-scale commercial farms, or to purchase from cooperatives. In Uganda, regulations prevented direct purchases from farmer, forcing tobacco exporters to procure from cooperatives. The cooperatives were considered corrupt and inefficient as a result of political interference and the appointment of civil servants to management positions. Farmers were often paid late and quality suffered. In 1997, the exporter was authorized to purchase directly from farmers as part of economic reforms. This led to more prompt payment, improved quality, and a three-fold increase in smallholder tobacco production over the next six years (Sejjaaka, 2004).

One of the most common problems in on-going contract farming schemes is side-selling, the sale of contracted output to other buyers. In some cases, farmers try to sell to other buyers in order to take advantage of a market price that is higher than the contracted price. In other cases, farmers sell to other buyers in order to avoid repayment of inputs they received on credit. Since the contracts are generally not legally enforceable, the only leverage the firm has is to refuse to work with the farmer in the future. The problem of strategic default on credit has been exacerbated in some countries by lax enforcement in government-run credit programs, leading to the perception among farmers that non-repayment is an acceptable option. Coulter et al (2000) lists a number of approaches have been taken to reduce default:

- Group lending, in which a group of farmers take joint responsibility for repaying the loans of any members that default.
- Information sharing among buyers, where buyers exchange information about contract farmers, their debts, and credit history.
- Incentives for repayment and strict treatment of defaulters, including exclusion from future contracting and seizure of assets.
- Good communication and close monitoring.

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.
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 of farmers is to withdraw from the scheme or to bring the case to local officials for intervention.

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 and Kirsten (2004) argue that this is one of the main reasons that companies often prefer to work with larger-scale farmers. One solution is to have another organization act as intermediary between the company and the farmers. A non-governmental organization (NGO) or donor-funded project may help organize farmers. Alternatively, a farmer cooperative may serve as an intermediary, facilitating the distribution of inputs and technical assistance, as well as the collection of the crop (Narrod et al, 2009; Coulter et al 2000). 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 et al, 2009).

And finally, as discussed above, contract farming is limited to certain types of commodities and markets. While it can be useful mechanism to help farmers diversify into new, high-value crops such as horticulture, cotton, tea, tobacco, poultry, or dairy, there are very few successful examples of contract production of staple grains and root crops for food production (Minot 1986; Eaton and Shepherd 2001; Sartorius and Kirsten, 2004). As such, contract farming is not likely to be successful in bringing credit, inputs, and technical assistance to the majority of small-scale farmers in developing countries.

5. SUMMARY AND POLICY IMPLICATIONS

5.1 Summary

Contract farming is a marketing institutions that has evolved to reduce transaction costs when there are economies of scale in processing or marketing but not in production, and when spot markets are not sufficient to match supply to quality-sensitive demand.

It is economically justified only when the benefits of vertical coordination surpass the costs of establishing the contracting scheme. As such, contract farming should not be seen as the solution to marketing problems in every commodity sector, nor should it be imposed or strongly promoted across all sectors. Specifically, it is most likely to solve coordination problems where the buyer is a large processor, exporter, or retail chain; where 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, or barley for large-scale breweries.
The empirical evidence supports proponents of contract farming who argue that it often raises the income of small-scale farmers by providing access to credit, technical information, and specialized inputs, while sometimes reducing farm-level risk. At the same time, there is partial support for opponents of contract farming who argue that it may favor medium-scale growers over small-scale farmers, though this depends on the specific circumstances and the policy environment.

Contract farming schemes typically face a number of challenges that limit their ability to deliver inputs, credit, and technical assistance to small-scale farmers. One of the most common problems 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 standard to evade their commitments. A third problem is the high cost of working with large numbers of small-scale 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.

In addition, from a rural development point of view, 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. We estimate that, for most countries in sub-Saharan Africa, the proportion of farmers involved in contract farming is less than 5%. Furthermore, it is unlikely that contract farming can be scaled up to reach the majority of small-scale farmers who produce grains and other staple foods.

The goal of government policy should be to facilitate the development of contract farming schemes, particularly those that involve small-scale farmers, but not to impose contracting or provide heavy financial incentives that would result in the use of contracting in situations where it is not appropriate. The next section provides more specific recommendations on the policies which would facilitate the development of competitive contract farming schemes.

5.2 Policy implications

Developing countries can promote pro-poor contract farming by creating a conducive policy environment. In particular, the following policy goals should be considered.

*Improve the Investment Climate:* As already discussed, contract farming schemes are usually organized by large-scale processors, exporters, or chains of supermarkets. Thus, an investment climate that facilitates private investment in agribusiness sectors is a necessary precondition for the development of private contract farming schemes. This improved climate involves reducing unnecessarily high capital requirements to start new firms, streamlining registration procedures, limiting licensing requirements to sectors in which public health or safety is an issue (such as pesticide distribution), developing a fair and transparent tax code, simplifying customs clearance procedures, adopting a modern commercial and legal code, and minimizing corruption.

*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. Although designed to protect farmer interests, these regulations often serve only to impose the use of an intermediary
organization, such as a cooperative, which may increase marketing costs. 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 and grading are often contentious issues in farmer-buyer relations within contract farming schemes. The government may also have a role in certifying compliance with private grades and standards, such as EUREPGAP, a set of standards developed and adopted by a consortium of European supermarkets.

*Facilitate Farmer Organizations and Other Intermediaries:* Contract farming schemes involving large numbers of small farmers often make use of an intermediary organization. A cooperative, an NGO, or even a large-scale farmer may serve as a link between the firm and small-scale farmers. The activities of local officials and extension agents can play a role in allowing and even promoting the development of such intermediary organizations, which reduce the transaction cost associated with dealing with a large number of small farmers. The organizations should, however, involve voluntary membership by farmers and voluntary contractual relations with firms to ensure that they are productive.

*Promote Public-Private Partnerships in Extension:* Traditionally, extension services have concentrated on providing technical assistance in the production of staple crops. As farmers diversify into high-value commercial crops, extension services must adapt by providing assistance on a wider range of crops and by providing more marketing assistance. Contract farming schemes often use cooperatives, NGOs, extension agents, and local officials as intermediaries. If extension services have the flexibility to provide services on behalf of the contracting firm and the incentives to serve small-scale farmers, it reduces the cost to the firm of working with small-scale farmers. Of course, the rationale for providing extension services is stronger if the scheme is working with small-scale contract farmers.

*Promote Competition:* One of the biggest concerns about contract farming is the fact that firms seem to have much greater market power and leverage than do the farmers who bargain with them. One of the best approaches for limiting this power is to allow or promote competition among firms. Policy makers should be cautious about responding to requests from agribusiness firms for a regional monopoly.6 This practice is particularly common in cotton and sugarcane sectors. At the same time, it is important to recognize that competition makes it easier for farmers to obtain inputs and credit from one company and then sell the harvest to another company, thus avoiding repayment of the loan. 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. The buyer may apply quality standards more strictly under such circumstances, reducing its obligation to purchase from contract growers. If these abuses

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6 Technically, this is a *monopsony*, where there is only one buyer (rather than seller).
are widespread, they can lead to loss of confidence and possibly the collapse of the contract farming scheme. 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. This is an area where there are no clear, widely applicable models, but one that deserves more attention.

**Enforce Contracts:** The government should explore alternative approaches to enforcing contracts, particularly between buyers and farmers. In countries with more advanced legal systems, this enforcement could be accomplished by establishing small-claims courts. In other countries, it may involve 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. In Benin the government has 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 his or her contract and the buyer who knowingly purchases cotton from growers who have contracts with other companies.

It is likely that contract farming will expand in sub-Saharan Africa as local diets gradually shift away from cereals and staple root crops, as markets link small-scale 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.
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