

Farmers, Markets and Contracts: Chain Integration of Smallholder Producers in Costa Rica

Ruerd Ruben and Fernando Sáenz

The agrarian production structure of Costa Rica is characterized by a high diversity of farm types, with a predominance of family-based enterprises. This historical inheritance makes the country significantly different from its Central American neighbours (Hall 1985, Seligson 1980).¹ Large capital-intensive plantations that produce for the international markets coexist with extensive livestock *haciendas* and small and medium-sized, owner-operated farms. Within the latter category of family farms, two types of producers can be distinguished: (1) a traditional *peasant* sector², comprised of low-income farmers living in former agrarian frontier zones and in rural settlements created by the Agrarian Development Institute (IDA), and (2) an important group of *semi-commercial farmers* that produce both traditional crops (such as coffee, bananas, sugar cane) and non-traditional crops (for example, tropical fruits, vegetables and ornamental plants) usually reaching competitive production performance. Both groups differ with respect to typical farm-household characteristics (age, education, family size, and dependency rate), production scale, resource endowments, spatial location (access to infrastructure) and market characteristics (access to inputs and information). Rural development policies in Costa Rica thus require rather differentiated incentive regimes to address the needs of the wide range of production units operating under different market and institutional conditions.

During the period 1950-1980, a large number of state-funded programmes – with subsidized credits, price guarantees for staple crops, input subsidies, and public research and extension activities – supported the agricultural sector in general and the traditional peasant sector in particular. After 1980, agrarian policies in Costa Rica suddenly changed their former import substitution orientation towards the progressive incorporation of the agricultural sector into an open-market economy with limited state interventions (SEPSA 1999, Pomareda 1996). In fact, the share of non-traditional agricultural production in the agricultural gross product increased from 10 per cent in 1980, to 19 per cent in 1990, 30.8 per cent in 2001, and 57 per cent in 2006 (Umaña 2002, SEPSA 2007).

The change from import-substitution schemes to a more open market-oriented model brought both opportunities and threats to the agricultural sector of Costa Rica. Whereas the competitiveness of many new activities certainly increased, at the same time a lack of coordination between the government and the private sector became apparent, inhibiting many peasant producers from taking advantage of the new challenges (SEPSA 1999, Doryan-Garron 1990). Consequently, within the smallholder sector, both winners and losers are found. The former moved into agro-export activities, using new production technologies and achieving vertical integration, capital accumulation and economic diversification, while the latter

remained with their traditional activities, using low-input technologies and competing on spot markets (Pomareda 2000). The new agrarian policies in Costa Rica could not prevent the former group from remaining vulnerable to poverty, given the constraints forthcoming from their limited access to new technologies, institutional innovations, input and output markets, and market information (Gonzalez Mejía 1998, Proyecto Estado de La Nación 1998). Hence, the envisaged rapid integration of different types of farmers into the agro-export sector did not work out as expected and high transaction costs and other market failures particularly affected the least-prepared producers.

To address these problems, stronger relationships amongst the different actors involved in the commodity supply chains are required, linking producers with agro-processing firms and consumer outlets. Contract farming is frequently mentioned as a possible way to overcome – or at least considerably reduce – problems occasioned by market and information failures and to provide a better institutional environment for integrating primary producers into the market. The potential role of contract farming is sometimes considered attractive as a mechanism for incorporating small and low-income farmers into the open-market economy (Glover 1984, Key and Runsten 1999). In addition, contracts are usually considered as a device for reducing risk and as a strategy for guaranteeing continuous supply (Glover 1987, Grosh 1994). This is particularly important during the initial phase of non-traditional agro-export production, when contracts provide farmers with the security for enabling the necessary investments. In practice, however, a wide variety of contractual arrangements is likely to coexist, and local farmers may be able to bargain different delivery conditions that serve their particular interests (Key and Runsten 1999).

The literature on contract farming presents two opposite views regarding the potential of this alternative market institution as a bridge between smallholders and agro-processing firms. While some authors warn against the downside of contracting arrangements due to the exclusion of smallholders and their unequal bargaining opportunities (Gwynne 2003, Murray 1997, Rickson and Burch 1996), other researchers argue that contracts offer a mechanism for integrating smallholders into dynamic markets by reducing market failures in credit, insurance and information (Singh 2002, Key and Runsten 1999, Grosh 1994).

In this article, we provide new evidence regarding the importance of contracts for the integration of smallholders into profitable specialized niche markets. We analyse the rationale and effectiveness of different types of contractual regimes in small-scale production and trade of pepper and chayote in Costa Rica. Both commodities have strongly increased their importance as a non-traditional crop since the 1990's, both for the local market and for export. These crops are very suitable for small-scale farmers, since production requires frequent attention and detailed care throughout the cropping cycle. This gives family farms a competitive advantage compared to large commercial plantations. In addition, pepper and chayote are attractive diversification crops that do not require complex technologies or machinery and can reach high and fairly stable yields per hectare. A major drawback for small farmers are the entry costs during the start-up phase, caused by initial investments for crop establishment and the maturation time before the first harvest takes place. Contracts may therefore be helpful as a strategy for overcoming these

constraints and enable market access while controlling uncertainty (Dorward 2001).

In the Costa Rican non-traditional sector we distinguish between different market configurations ranging from competitive markets to a local monopsony.³ The latter situation frequently occurs when markets are thin and processing is controlled by a limited number of firms. Regarding delivery conditions, three types of contractual arrangements coexist, based on product deliveries without any contracts, or through verbal or written commitments. Producers may be simultaneously involved in different networks. Attention is focused on the implications of different market situations and contractual arrangements for farmers' resource use decisions and their investment and management strategies. When farmers depend on a single trader-processor, investments are likely to be more risky. Local competition may therefore be required as an incentive for enhancing farmers' willingness to improve input use in non-traditional production.

Particular emphasis is laid on the changing nature of the contracts during the household life cycle. Farmers need formal contracts in early phases of the crop establishment process to safeguard their initial investments, but in subsequent phases and when more competitive market conditions arise, they can rely more on verbal commitments (Lutz and van Tilburg 1998). The latter are far more difficult to enforce and could easily lead to disloyal behaviour. Contracts can thus serve as a vehicle for overcoming transaction and information costs, but lose their function when farmers become further integrated into the market.

This study draws on field surveys amongst (a) 50 pepper producers (representing 65 per cent of all pepper producers) living in peasant settlements in the northern region of Costa Rica (*Huetar Norte* region) and (b) 120 chayote farmers (representing almost a quarter of all national chayote producers) located in *Ujarrás* in the southern Central Valley. All farmers in the survey belong to the peasant smallholder sector (with farm areas up to 15 ha and cultivated area of export crops of 2-4 ha). Information was collected regarding farm characteristics (farm size, soil quality as perceived by the farmers, access to credit), household characteristics (family size, age, gender, education, farming experience measured as the number of years involved in crop production; risk attitudes), production systems (land use, input applications, yields), exchange regimes (prices, volumes, quality grades) and contractual conditions (payment procedures, cost-sharing arrangements). The analysis relies on an institutional economics approach, using statistical procedures for identifying the determinants of contract choice and the implications for farmers' production, marketing and investment decisions (Saenz and Ruben 2004, Ruben et al. 2001). We provide here the conceptual and generic conclusions regarding the feasibility of contract farming for different types of rural households under specific market and institutional regimes.

Contract farming

The widespread existence of market failures in developing countries limits the ability of smallholders to become involved in new commercial activities that require high initial investments and specialized inputs (Cook and Chaddad 2000). Imperfect markets and high transaction costs are typically caused by poor market infrastructure and farmers' limited access to information on market opportunities and

production technologies (Harriss-White 1999, Magnusson and Ottoson 1996). While these causes are largely exogenous, other dimensions of market failure tend to be household-specific. Farmers have different resource endowments and often perceive multiple objectives that reflect their behaviour regarding risk and uncertainty (Ellis 1988, Ruben et al. 1994). Most small and medium-size farms are family enterprises with interlinked decision-making regarding production, consumption and investment goals (Ellis 1988, Sadoulet and de Janvry 1995). Even where markets do exist, they may selectively fail for particular categories of farmers, rendering commercial production less feasible (de Janvry et al. 1991). If markets are thin for specific goods or for particular inputs, prices are no longer determined by supply and demand, but institutionally defined. These market failures thus directly affect farmers' allocative decisions regarding land use, labour intensity and investments.

New institutional economics approaches claim that market failures lead either to the emergence of a surrogate institution for allowing transactions to take place, or to a failure of exchange to occur (Stiglitz 1989). Local institutions emerge as a response to missing markets in an environment of pervasive risks, incomplete markets and information asymmetry (Key and Runsten 1999, Harriss-White 1999). New exchange arrangements that appear for dealing with market and information failures often perform several market functions simultaneously (Lutz 1994). Such arrangements are frequently based on vertical and/or horizontal market integration.

Contract farming can be regarded as an institutional response to imperfections in markets for credit, insurance, information, factors of production and output, as well as a device for reducing transaction costs associated with search, screening, exchange, bargaining and enforcement (Key and Runsten 1999, Dorward 2001). Contracts can be characterized as 'agreements between farmers and firms – either verbal or written – specifying one or more conditions of production and marketing of the farmer's crop' (Glover 1984). For different types of market failures, contract farming may be a welfare-improving governance device (Schejtman 1994, Grosh 1994, Key and Runsten 1999). Though contract farming is often claimed to contribute significantly to economic development, results of case studies regarding the implications of contract farming for smallholders' welfare are less conclusive (Glover 1990, Porter and Phillips-Howard 1997). Benefits of contracting schemes seem to depend much on the specific contractual terms, the technical characteristics of the crop, the market environment and the socio-political context.

Recent contributions to contract choice literature suggest that the nature of contractual arrangements is likely to vary substantially for (a) different types of producers and (b) different market conditions (Dorward 2001). Formal contracts are likely to be preferred by less-endowed and risk-averse farm households. Smallholders with scarce productive assets (land, family labour, farming experience) or with limited access to market outlets possess few alternative options and may therefore be willing to engage in contractual arrangements. Such farmers generally face low opportunity costs of labour, are less able to obtain credit through formal lending institutions and thus possess scarce options for self-insurance. Consequently, given their restricted bargaining power and limited exit options, such farmers are considered an attractive party to enter into a contract with a trader or processing firm (Key and Runsten 1999). Otherwise, farmers with more resources

and a longer experience may be able to deliver their products on the spot market and can bargain better delivery conditions with processing firms.

Prevailing local market conditions also influence farmers' production and exchange decisions. While contract farming generally emerges in a situation of monopsony markets for non-traditional crops (Glover and Kusterer 1990, Grosh 1994, Key and Runsten 1999), it can also provide an important contribution to further market development. In new areas of production, buyers can stimulate supply by offering input delivery and cost-sharing contracts to growers. Once production has started, the buyer enforces the contracts through its monopsony power. This also implies that production losses (due to weather, pest or diseases) and quality problems can easily be transferred downwards to the farmer.

However, if other firms enter into the same region, or when farmers become more experienced and organized to supply each other with information and assistance, buyers can no longer exercise full market power and profitability of contracts will decrease. In a more competitive market environment, growers gain the ability to choose among various contract suppliers and the latter must thus compete (Key and Runsten 1999, Escobal et al. 2000). This may lead to free-rider behaviour by new buyers, taking advantage from services provided by the first-mover firm. Hence, contracts can be expected to become less profitable once market conditions become more competitive. Furthermore, the possibility of default increases in a more competitive environment, increasing the suppliers' contract enforcement costs (Glover and Kusterer 1990). When producers start organizing themselves, this increases their bargaining power and offers possibilities to disseminate information from contract farmers to non-contract farmers. From a farmers' perspective, contracts will become less attractive in an established and stable market with buyers competing on prices (Key and Runsten 1999). The utility of abiding by the contract must be greater than what could be received at alternative outlets. But even when buyers cannot enforce contracts, farmers still might respect such arrangement as a kind of safety net that can be needed under adverse market conditions.

The diversity between farmers and local differences in market conditions give rise to a wide variety in contractual arrangements. Farmers with a formal contract enjoy considerably more security compared to farmers with a verbal agreement. The former are, therefore, expected to attain a higher degree of specialization and can be less engaged in off-farm activities. Moreover, farmers with contracts that include technical assistance are expected to invest more in fertilisers and pesticides use. Higher input applications and more technical assistance will lead to better yields and higher farm-household revenues.

Contract farming can also be considered as a suitable strategy for promoting improved resource management. Contracts provide information on appropriate soil conservation techniques (through technical assistance) and might enhance farmers' willingness to adopt these practices. Increased use of soil conservation measures will not only occur as a device for reducing farming risks but also because farmers have an economic interest to comply with the contracting terms. Another link between contract farming and resource use decisions relates to more rational applications of inputs, like fertilisers and pesticides. The buyer may recommend and even deliver a package of inputs leading to optimal crop performance and quality. Especially for perennial crops, the buyer has an economic interest in avoiding soil de-

pletion and will therefore try to enforce effective use of chemical and organic fertilisers. For export crops that are subject to strict quality surveillance, control on the amounts and types of pesticides used is equally important.

Non-traditional crops in Costa Rica

Contractual systems are frequently used for the development of non-traditional crops. We compare the supply chains for the pepper and chayote, focusing on differences in (a) the characteristics of the commodities and (b) the types of farm households, (c) market outlet orientation and (d) contract choice (see Table 1). This comparison provides insights in the endogenous character of the selected contractual arrangements (Escobal et al. 2000) and permits to draw conclusions regarding the efficiency and equity effects of supply chain cooperation.

Commodity characteristics

Both pepper and chayote are non-traditional crops that are highly labour intensive with an almost continuous harvest throughout the year, which make them particularly suitable for small-scale production.⁴ Production technologies and cropping systems are fairly homogenous and simple. Timely and frequent harvesting determines quality to a large extent, and labour is thus a critical factor for delivery compliance. In both supply chains, commodities are delivered in a fresh state from producers to the processor. Options for improving crop quality also depend on soil conditions (pepper) and chemicals use (chayote). The supply chains differ, however, in the destination that the commodities follow in the chain downstream. Pepper is basically processed (dried) and transformed according to requirements of the domestic food-industry market, whereas fresh chayote continues with little added-value to retailers and consumers, since options for storage or industrialization of chayote are absent.

An important source of differentiation between both supply chains is related to the technical characteristics of the crop, influencing the farmers' level of asset specificity and uncertainty. The chayote product cycle lasts fourteen months, and the crop becomes productive after the fifth month. The infrastructure is certainly expensive, representing roughly a third of total production costs. It can eventually be used for other cash crops or left unused for a period of time. These characteristics allow producers to adjust their production plans and easily quit the activity. On the contrary, the pepper production cycle ranges between twelve to fifteen years and the plantation starts to deliver production only after its third year. These characteristics already bind producers to the activity, since the establishment of the crop represents a high level of invested effort. Consequently, pepper producers can only start up cultivation if a certain relationship with a helpful partner exists (a resource-providing processor that commits to purchase pepper) and/or when they can be sure that there are enough processors willing to buy the fresh pepper.

Table 1. Comparison of markets and contracts

Characteristics	Pepper (<i>Piper nigrum</i> L.)	Chayote (<i>Sechium edule</i> Sw.)																																
Commodities	Perennial tree crop (12-15 years); traded in fresh bunches; quality depends on maturity at harvest. Visual quality inspection. Value added in processing (white pepper requires higher quality)	Semi-perennial vegetable crop (14 months), susceptible to plant diseases and quality degradation. Appearance inspection focused on uniformity. Trade with little added-value (only washing, grading and packaging).																																
Farmers	Small number of farmers (75), spatially located in traditional communities and peasant settlements	Large number of farmers (500) with different farm size and experience. Two distinct segments: traditional producers and newcomers																																
Market outlets	Domestic niche market; domestic food processing and exports. Two distinct market segments, with local monopsony and elsewhere more competitive conditions	Competitive (and growing) market, with domestic and international outlets. No dominant operator; open competition between fourteen independent processors; eight processors are linked to international brokers.																																
Market segments	<table border="1"> <thead> <tr> <th>Monopsony market</th> <th>Competitive market</th> </tr> </thead> <tbody> <tr> <td>Young farmers</td> <td>Older farmers</td> </tr> <tr> <td>Small plots</td> <td>Larger farms</td> </tr> <tr> <td>Better land quality</td> <td>Degraded land</td> </tr> <tr> <td>Young plantations</td> <td>Mature plants</td> </tr> <tr> <td>Specialized</td> <td>Diversified</td> </tr> <tr> <td>Low labour use</td> <td>High labour use</td> </tr> <tr> <td>Low yields</td> <td>High yields</td> </tr> <tr> <td>Organized</td> <td>Not organized</td> </tr> </tbody> </table>	Monopsony market	Competitive market	Young farmers	Older farmers	Small plots	Larger farms	Better land quality	Degraded land	Young plantations	Mature plants	Specialized	Diversified	Low labour use	High labour use	Low yields	High yields	Organized	Not organized	<table border="1"> <thead> <tr> <th>Traditional producers</th> <th>Newcomer producers</th> </tr> </thead> <tbody> <tr> <td>Larger plots</td> <td>Small plots</td> </tr> <tr> <td>Low quality</td> <td>Better quality</td> </tr> <tr> <td>Own capital</td> <td>Capital constraints</td> </tr> <tr> <td>High experience</td> <td>Low experienced.</td> </tr> <tr> <td>Hired labour</td> <td>Family labour use.</td> </tr> <tr> <td>Internal inputs</td> <td>Purchased inputs</td> </tr> </tbody> </table>	Traditional producers	Newcomer producers	Larger plots	Small plots	Low quality	Better quality	Own capital	Capital constraints	High experience	Low experienced.	Hired labour	Family labour use.	Internal inputs	Purchased inputs
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Type of contracts	Resource-providing (written) contracts where prices are adjusted with inflation. Farmers commit to deliver in a long term relationship. Promissory note as guarantee against contract breach. Verbal resource-providing contracts with seedling supply and technical assistance Open market exchange (with flexible arrangements) in competitive market segments.	Delivery contracts (mainly verbal) to guarantee access to market outlet. Interlinked contracts (with technical assistance, credit and input provision) Farmers' commitments to deliver enforced by processor. Mostly newcomer farmers rely on contracts to start-up their business.																																

Producers' characteristics

In both supply chains, farm households with different socio-economic and production system characteristics are involved. Pepper producers are located in small settlements, spatially dispersed throughout the northern region of Costa Rica. Depending on their location, they operate under monopsony or competitive market conditions. Farmers in the monopsony market segment are usually younger than those in the competitive segment, show higher degrees of specialization in pepper, while their pepper plantations are more recently established. Since their plantations

are in the early stages, income derived from pepper is lower than in the competitive segment, and most farmers need alternative income sources. Therefore, they can devote less working hours to their pepper plots. The use of contracts is more frequent in the monopsony segment, where farmers are also more likely to receive credit and technical assistance. The mean price for delivered fresh pepper is lower, thus indicating the depressing effect of the monopsony market. Farmers' organizations are more active in the latter region as a device for compensating the monopsony power of the processor. Since the payback time for the initial investment in the plantation is two to three years, farmers are highly dependent during the risky start-up phase of their plantation.

Conversely, farmers involved in the competitive market segment usually operate larger but more degraded plots. They have mature plantations that are more productive but also demand more labour. This category of farmer is less dependant on contractual relations with processors and requires less technical assistance and credit. Since they obtain a better price than in the monopsony segment, their prospects for expanding pepper production are significantly larger. Farmers expect to reach higher returns for land and labour under the conditions of open competition. These farmers can be characterized as self-confident producers that have already passed the risky initial establishment phase of the crop. In addition to the competitive market environment and the prospects for further market expansion, the fact that their plantations are already in the productive stage provides them with opportunities to develop bargaining power vis-à-vis the processors.

Producers in the chayote sector are spatially concentrated in a single valley. According to their socio-economic characteristics, these farmers can be classified in two categories: (a) traditional producers and (b) newly established producers. Income diversification is very limited amongst both groups of farmers (only some horticultural production was found providing additional income during the non-productive period of chayote) and therefore the availability of either family or hired labour determines feasible cultivated areas. Traditional producers have a long history of chayote production and established family roots in the area. These farmers possess more working capital of their own and have larger plots, for which they hire wage labour especially for the harvest (labour input use represents 70 per cent of total production costs). The second category of 'newcomers' comprises farms established in peasant settlements, and organized by the governmental rural development institute (IDA). These producers usually possess less capital and are therefore more dependent on credit provision, input supply and technical assistance. Notwithstanding their limited experience, these smallholders still enjoy advantages compared to larger outgrowers, since there are limited options for mechanization of production and the crop requires large amounts of labour. Therefore, smallholders can use their family labour and thus enjoy the advantage of lower search and supervision costs. In addition, the soil quality conditions in the settlements (higher fertility and better drainage) are more appropriate for chayote cultivation, and the newly established farmers can rely on more advanced production technologies.

Market organization

Both supply chains exhibit a different market organization in terms of outlets and agents. The pepper supply chain is characterized as a closed niche market, whereas the chayote chain operates in a more competitive market environment. There are no spot markets in the pepper supply chain, and only a limited number of producers that have to deal with few processors. After the year 2000, only one unique pepper processor remained, making the supply chain even shorter and more uniform, shifting definitely towards a monopsony situation. In the context of a rather stagnant market, producer organization for reinforcing bargaining power becomes increasingly relevant.

Conversely, the chayote supply chain involves more producers (500) and processors (14), operating in a rather competitive environment, with two well-defined outlets, namely the international and the domestic market. However, only eight processors have made deals with at least five international brokers, implying that a limited number of agents are in fact related to international market outlets. Given the large volume of the domestic (and growing regional) market, chayote trade is likely to expand in the near future, and more producers might be willing to enter the market.

Contract choice

Processors active in both supply chains operate at different scales of production and rely on a wide variety of sourcing mechanisms. Different degrees of vertical integration with primary producers are effective, depending on the level of trust between supply chain partners. Contract choice is strongly dependent on bargaining power relations and expected mutual advantages in sourcing strategies by offering different types of contractual arrangements.

In the monopsony market segment for pepper, the largest and most enterprise-oriented processing firm fully specialized in the production of white pepper originally declined any backward integration with the primary production. The company only sells white pepper to one large industrial plant in San José, for which quality of fresh pepper turned out to be a key issue. In this segment, both written contracts and verbal agreements are used to guarantee timely delivery and full capacity utilization. On the contrary, in the competitive market segment, three companies are competing only using verbal agreements with producers. Two of them are specialized in the processing of black pepper that requires less stringent quality standards. The latter companies show, however, a lower scale of operations compared to their competitor that operates at the higher quality segment and maintains strong backward integration with primary production.

Enforcement of contracts was little effective for processors, especially in the competitive market segment. In fact, the proportion of defaults on contracts turned out to be high: forty per cent of the interviewed farmers operating under a delivery agreement proved to be disloyal. This is in line with other findings from the literature (see Glover and Kusterer 1990, Grosh 1994, Key and Runsten 1999), since farmers are tempted to default on their contracts in markets with a sudden increase in competition and prices. It also confirms certain weaknesses for processors to

enforce contracts and points to the importance of maintaining a high degree of confidence with farmers, thus reinforcing mutual dependence between producers and agro-processors to guarantee deliveries on future occasions.

The essential difference between the contracts provided by the companies refers to product and processing specifications, the type of guarantees used for enforcing delivery, the procedures for price determination, and whether immediate or delayed payments are used. Written contracts provided by the pepper firms are defined as *resource-providing* arrangements that include input deliveries (seedlings) and technical assistance. These contracts closely resemble *quasi-vertical integration* based on long-term co-investment activities (Hobbs 1996) and offer farmers a cheap and low risk way to acquire inputs and technical assistance. However, the associated risk for farmers with written contracts is being locked-in by the processing firm into a long term arrangement, with the consequent loss of bargaining power. Moreover, farmers have to sign a promissory note for the value of supplied seedlings that has to be paid when they default on the contract. Verbal agreements offered by the companies operating in the competitive market segment can also be defined as *resource-providing* contracts that include input provision and free technical assistance. For the company, resource provision is part of a strategy of backward integration to guarantee raw material deliveries to the processing plant. On the other hand, verbal agreements provided by both companies are strictly *market-specification* contracts that are limited to provisions regarding price, delivery time and quantity. The latter types of arrangements refrain from any involvement in the production process and are limited to simple product delivery specifications. In practice, we found producers selling their pepper to any of the buyers without previous delivery agreement. Farmers' decision to choose for a specific agreement mainly depends on their individual needs and preferences.

Most of the chayote processors are family-owned companies that reside in the area. Some processors also operate their own plots producing fresh chayote, but this production is not enough for fully occupying the installed capacity and therefore they purchase additional amounts of chayote from nearby producers. Processors perform several tasks to match international brokers' parameters, taking care of the transport from the plot to the processing plant, product selection, washing of the fruit, waxing and bagging individual chayote, packing in boxes, and transporting the boxes to the harbour in refrigerated and sealed containers.

Almost all chayote processors only offered verbal agreements to farmers, which can be defined as strictly *market-specification* contracts. In general, farmers with these verbal agreements obtain access to information, input supply, credit and even technical assistance, with positive effects on product quality and loyalty. Given the shorter production cycle and the relative homogeneity of the produce, such contracts suffice for linking producers into the supply chain.

Roles of contracts for smallholder development

Contractual systems with a traders or processors have been used for the marketing of pepper and chayote for a number of consecutive years, given the investment requirements for crop establishment and the features of an emerging market. The analysis on farmers' contract choice in both supply chains permits to identify three

major functions of contracts, namely (1) insurance device, (2) provision of incentives, and (3) provision of information (see Table 2).⁵ These functions have a decisive effect on the farmers' decisions regarding resource allocation and supply chain integration. We discuss the implications of contracts for guaranteeing smallholder access (equity), production efficiency, and long-term sustainability of supply chain cooperation.

Drivers: insurance, incentives and information

Contracts provide an insurance device to enable farmers to engage in new production activities and to gain access to specialized markets. In the pepper case, insurance mechanisms like the commitment to purchase the crop by the processor throughout the productive cycle, the guarantee that farmers receive a fixed price for their produce, and the protection against inflation by adjusting purchasing prices enable resource-constrained farmers to participate in the production of non-traditional crops, despite market and price uncertainties. In the chayote case, farmers enjoy the certainty of a higher purchase price when delivering the produce to the export market. Moreover, a back payment system is in force that gives farmers with more frequent deliveries access to a continuous flow of income. These mechanisms reduce search costs, since chayote producers can obtain a better price without investing much time in identifying markets outlets.

Contracts also provide incentives for investment and thus increase the asset-specificity on the farmer's side.⁶ In the pepper case, *resource-providing contracts* offer an incentive that encourages farmers to use more fertilizers and pesticides. This advantage can become even larger when transport costs to the firm are covered by the processor. In addition, *resource-providing contracts* are effective to encourage farmers towards investments in soil maintenance and conservation activities. These measures are usually costly and time-consuming, and farmers will

Table 2. Functions of contracts

Functions	Mechanisms
Insurance	Commitment of purchase (P and Ch) Price certainty (P) Price with inflation correction (P) International prices are usually higher than the domestic prices (Ch) Promissory of back payment (Ch) Frequency in transactions (P and Ch)
Incentives	Delivery of input provision (P) Contract functions as collateral for accessing credit from the input store (Ch) Soil conservation measures (P) Transport costs of delivered produce (P)
Information	Access to (inter) national market outlets (P and Ch) Technical assistance by the processor and a public agency (P and Ch) Quality requirements and grading (P and Ch) Measurement of maturity (P)

Note: (P) refers to pepper case and (Ch) refers to chayote case.

only devote labour time to these activities if compensated by a better output price and more transactions. This supports the literature regarding the importance of *resource-providing contracts* and vertical integration for enhancing sustainable agricultural intensification (Kuyvenhoven and Ruben 2002, Key and Runsten 1999). In the chayote case, there are no *resource-providing contracts* but simple *market-specification contracts* in the form of verbal agreements. However, this contractual form functions as collateral for accessing inputs from input stores. Since frequently delivering farmers obtain their back payments every week, they can easily access credit for input supply when store owners are aware of these contract terms. Hence, the incentives provided by the contract guarantees flexible and timely access to credit, instead of the expensive and time-lagging formal credit procedures.⁷

Finally, contracts function as a mechanism to provide farmers with information about the structure of the market they operate in. This is very important to prevent false expectations and adverse selection problems. In the pepper case, contracts include private technical assistance for informing farmers not only about the structure and opportunities of the market, but also about production techniques and quality requirements of the produce. In the chayote case, technical assistance services are provided by the *Ministerio de Agricultura y Ganadería* (MAG). This public extension agency focuses in particular on inexperienced farmers in peasant settlements that started to produce chayote under a verbal agreement with a processor, thus providing an indirect mechanism to inform these farmers about the production and market requirements. As private extension tends to be more costly compared to public provision, they can easily pay off in terms of higher yields and/or less rejection.

Outcomes: equity, efficiency and sustainability

The implications of contractual exchange for income distribution, efficiency in resource allocation and long-term supply chain relationships are outlined in Table 3. Contracts can be a mechanism for enhancing equity by incorporating certain types of producers into specialized (inter)national markets. Comparing farm households' characteristics in relation to different types of contracts in the pepper case, we concluded that contracts are mainly suitable for certain categories of farm households, but certainly not for all. We found different types of farmers choosing between the three available contractual forms, namely written contracts, verbal contracts, or no agreement at all. In a monopsony market, poorer but better educated farmers with small acreages and limited farming experience strongly prefer written or verbal contracts. They operate small areas of non-productive (recently established) pepper and meet initial investment constraints, making them reliant on non-agricultural income. On the other hand, larger and more experienced farmers that maintain high-yielding pepper plantations are far less dependent on single agricultural activities and are therefore more likely to rely on spot market exchange as part of their risk diversification strategy. Pepper prices are slightly higher in the competitive market, where better endowed farmers without a contract were able to negotiate a more attractive price.

Table 3. Implications of contracts

Effects	Mechanisms
Equity (access)	Selection of farmers with high labour availability Selection of farmers with budget constraints Selection of farmers with more fertile plots Co-investment/credit targeted to smallholders
Efficiency	Technical recommendations and technical supervision. Higher and better input use Quality up-grading Frequent deliveries Sustained quality of produce leads to frequency
Sustainability	Frequency of successful transactions Loyalty-enforcement Building up reputation Preference of frequent and loyal suppliers

The income level and composition have a clear effect on farmer's contract choice and their bargaining power. Income diversification under farmers' control (for example, access to alternative household income sources, such as other cash crops and livestock activities) enables farmers to increase their asset-specificity in pepper crops, even without the insurance provided by contracts. Since these types of farmers are able to refrain from long-term contractual ties, they tend to be less reliable partners for contractual arrangements with processors.

In the chayote case, we found farmers exclusively delivering produce to either the export market or the domestic market, whereas an intermediate group engaged in both market segments. Several farm household characteristics are positively related to the export market, such as scale of production and farmers' experience. However, we also find newcomer farmers in peasant settlements oriented towards the export market. These producers rely more on family labour and have more high-quality land, which allows them to develop small-scale, intensive cultivation. Hence, not only traditional farmers are able to participate in the export market, but also newcomers making use of their comparative advantages. Moreover, farmers that were able to establish agreements with processors are more likely to become involved in export delivery. This is plausible since contracts are initially a useful device for providing security against market uncertainties. Producers deliver a larger share to the export market when more intensive production systems are established and thus a higher quality of produce can be reached. In other words, richer producers use their orientation to export markets as a twofold mechanism: for gaining bargaining power *vis-à-vis* the processor, and as an additional source of income.

The analysis of contract choice in chayote revealed that scale of production is positively related to engagement in verbal agreements with a processor, whereas experience is negatively related. This is similar to the outcome in the pepper case, where young and less-experienced farmers are more likely to become involved in contractual arrangements, since contracts provide a certain level of security against market and price uncertainties. Moreover, farmers with previous delivery arrangements receive a higher average price compared to farmers selling only in the do-

mestic market. Hence, the delivery agreement is convenient as a risk-reducing device for less-experienced farmers.

In terms of the efficiency, a contractual relationship between farmers and processors has a positive effect for resource allocation and product quality. Non-price factors involved in the contracts, such as input supply, technical assistance and information, induce better input use, improvement of production systems and quality upgrading, which favours more frequent and successful transactions. These facilities also tend to reduce risk exposure and enable farmers to adopt improved production technologies. However, these advantages may be challenged when opportunistic behaviour arises or market conditions change, rendering contract enforcement less effective.

The analysis of market channel choice indicates that small-scale farmers particularly need contracts during the early phase of the establishment of perennial crops, as a guarantee for their investment efforts. In subsequent phases and when more competitive market conditions arise, producers prefer verbal commitments to written contracts. Consequently, contracts fulfil rather different roles during the farm household life cycle and are shaped differently under various market conditions. In the absence of penalties, pepper farmers with delivery commitments may become disloyal to their buyer in markets with more competition. Many farmers sell the major share of their harvest to the fixed buyer but also deliver small volumes to competitors.

Regarding sustainability, contracts play an important role to intensify farmers' production systems by enhancing better land use and involving more labour in crop management and post-harvest handing. Pepper farmers with formal contracts applied 40 to 70 per cent more soil conservation practices compared to other producers without any delivery contract. This has positive implications for crop yields, generates local employment and possibly also leads to better product quality, which enhances mutual confidence and reduces the risk of product denial. These effects are mainly accomplished by focussing on specific types of farmers (notably less-experienced farmers with large family labour availability, and farmers that rely on the crop as their main income source).

Frequent and successful transactions require the accomplishment of quality criteria defined by processors and depend on the continuous flow of information between the contracting parties. We noticed that opportunistic behaviour (selling produce to other buyers when a better price is offered) can be effectively controlled by the engagement in resource-providing delivery contracts, since farmers prefer stable relations with their buyers in order to safeguard their investments. This outcome is in line with the literature indicating that successful and continuous transactions are based upon reputation between the contracting parties (Hobbs 1996). Non-price stipulations in contracts, such as technical assistance, collection frequency, and regular payments thus reinforce long-term supply chain cooperation.

Policy implications

In this article we analysed the structure and performance of contracting schemes for non-traditional crops in the Costa Rica to identify the effects of different types of contracts and market configurations on farmers' resource use and investment

decisions. Special attention is given to the incentive implications of contracts for the adjustment of production systems and livelihood strategies. Some main conclusions can be summarized as follows.

First, the analysis of market channel choice indicates that farmers need contracts particularly during the early phase of the establishment process of perennial crops, as a guarantee for their investment efforts. In subsequent phases and under more competitive market conditions, producers prefer verbal commitments to written contracts. Furthermore, in the absence of sanctions, around 40 per cent of pepper farmers with a delivery commitment became disloyal to their buyer in markets with increasing competition. Most farmers deliver the major share of the harvest to their fixed buyer but sell to competitors as well. Consequently, contracts fulfil rather different roles during the farm household life cycle and are re-shaped differently under modified market conditions.

Second, the study confirms that high risk-exposure of farmers leads to a preference for written contracts instead of verbal commitments. This is particularly the case for newcomers in the chayote sector and younger farmers entering pepper production. More experienced farmers are able to rely on a more risky strategy when they possess other income-generating alternatives that make them less dependent on non-traditional crops.

Third, the comparison of different market situations indicates that a local monopsony might generate incentives for realizing fixed investments in non-traditional crop plantations. The transition towards more capital-intensive production systems is favoured when contractual regimes offer (temporarily) lower input costs. This illustrates that close complementarities exist between technology choice and market organization.

Fourth, the analysis demonstrates that contracts provide an important incentive for more intensive input use, but that they also tend to induce a shift towards hiring wage labour to replace family labour. Thus, family labour can be allocated to other profitable non-agricultural activities (such as services, construction, and tourism), which can further stabilize household income. This partly confirms the hypothesis that contracts can enhance the required certainty for small-scale producers and hence increase their willingness to invest. The fact that mainly less-endowed farmers engage in contract farming confirms this conclusion. In addition, contracts improve access to market information, thus reducing a key market failure. Consequently, agrarian contracts might complement policy incentives aiming at more efficient and sustainable land use systems.

Public and Private Roles

While contracts are essentially private arrangements, there still remains important room for public action to safeguard supply chain cooperation and contract enforcement. Most important in this respect is public support for the development of grades and standards for supply chain upgrading. The implementation of public grades and standards (G&S) is of key importance for supply chain compliance. Most current quality standards only specify basic physical parameters (colour, shape, size, external damages). Even when most producers are aware of the usage restrictions for chemicals on produce oriented towards the export market, rejection

of full containers still frequently occurs. Since producers can easily sell sub-standard produce on the domestic market, chemical residues represent a serious public health risk. Quality defaults are mostly punished via price discounts rather than by exclusion from the market. Even while refusal rates vary according to demand on major target markets, product denial and refusal due to contractual breach tend to reinforce the distrust between producers and processors.

Clear rules defined by a recognized authority and a well-defined system of classification could improve chain coordination and reduce distrust between contracting parties. In both case studies, quality of produce was determined only by simple visual inspection.⁸ These 'rules' are informally transmitted to producers by technicians and other experienced producers, and disputes on rejection rates are frequent. Due to the absence of formal G&S, contractual arrangements still have no significant impact on quality performance.

In the supply chains of pepper and chayote, small and medium-scale processors are dealing with smallholder producers. None of these actors possess the capital and human capacity to create and implement private G&S without the support of governmental agencies or third party certification agents (Reardon et al. 2001). The government should thus play an important role in defining minimum G&S, providing information regarding new market opportunities, and promoting consensus on generally accepted quality regimes, and guaranteeing the enforcement of effective control procedures for quality assessment.

The latter issues are particular important in the chayote case, where only a few exporters have limited control over quality supervision in the main target market in Miami. In the pepper chain, private G&S are already applied to the processing company and its main buyer, but not to the domestic retail sector with strong competition among brands. The combination of contractual terms with properly defined (public or private) G&S may become an important inclusive strategy aiming to promote sustainable production. This calls for private-public alliances around agreements regarding generally recognized product and process standards and related to reward and enforcement mechanisms.

Finally, upgrading is another important strategy for enhancing value-added generation by small and medium-scale enterprises operating in global markets. Further processing is a desirable strategy for firms in developing countries, but little is known on the contractual conditions that favour this upgrading process. Product innovation (better cultivars with more product resistance or better flavour) requires in-depth investments in research and development. Long-term agency co-operation within chains is key to establishing successful governance regimes towards upgrading (Giulani et al. 2005, Doryan-Garron 1990). Market competition easily leads to opportunistically behaviour that may delay investments in product innovation. Quality upgrading can only be expected through coordinated action, dovetailing the interests of a capital-investing processor and an organized group of producers. Upgrading in supply chains of perishable commodities thus strongly depends on collective action (Giulani et al. 2005). This points to another important role for the government (and voluntary agencies alike), which is to foster horizontal and vertical agency coordination as part of an integrated strategy towards supply chain upgrading and integrated rural development.

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Ruerd Ruben holds the chair in development studies at the Centre for International Development Issues (CIDIN), Radboud Universiteit Nijmegen, the Netherlands. He is a development economist with broad field experience in Central America, Sub-Saharan Africa and Southeast Asia. His current research is related to institutional arrangements in value chains, microfinance and migration networks, and public-private partnerships. Recent publications include: *Tropical Food Chains: Governance Regimes for Quality Management* (edited volume, Wageningen Academic Publishers, 2007); *Sustainable Poverty Reduction in Less-Favoured Areas* (published with CAB International, 2007); and, 'Vegetables Procurement by Asian Supermarkets: A Transaction Cost Approach', in *Supply Chain Management: An International Journal*, Vol. 11, No. 1, 2007 (with D. Boselie and Lu Hualiang). <r.ruben@maw.ru.nl>

Fernando Sáenz-Segura is director of research at the Centro Internacional de Política Económica para el Desarrollo Sostenible (CINPE) of the Universidad Nacional (UNA), Heredia, Costa Rica. He has a master's degree in natural resource management from CATIE (Centro Agronómico Tropical de Investigación y Enseñanza, Costa Rica) and obtained his PhD degree at Wageningen Universiteit, the Netherlands, with a study on contract farming in Costa Rica. Recent publications are: *Contract farming in Costa Rica: Opportunities for Smallholders* (PhD Dissertation, 2006), and 'Export contracts for non-traditional products: Chayote from Costa Rica', *Journal on Chain and Network Science*, Vol. 4, No. 2, 2004. <fsaenz@una.ac.cr>

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Notes

1. The entrance of Costa Rica in the world coffee market in the early 1820s took place in the absence of coercive state institutions and enabled smallholder producers to widely engage into commercial production, thus triggering a process labelled as 'rural democratization' based on a strong rural middle class (see Seligson 1980). In other neighbouring Central-American countries, a more dualistic agrarian structure prevailed with far less opportunities for land lease and sharecropping arrangements. Plantation-like regimes using permanent and temporary wage labour in the other Central American countries relied more strongly on political and economic coercion mechanisms and paved the way for their authoritarian regimes.
2. This traditional peasant sector produces mostly maize and other basic grains mainly for local exchange and consumption, livestock, and some cash crops (coffee and sugar cane). They rely on low-input production technologies, maintain simple post-harvest management practices, and family

- labour may be partly involved in off-farm activities.
3. A monopsony market refers to a situation where there is only one buyer who meets the supply of various producers and will therefore be able to set the purchasing conditions.
 4. Chayote (or vegetable pear) is an indigenous vegetable crop that is grown in mid-altitude areas with a high degree of humidity. Production is highly labour-intensive, but also requires some investments in wooden posts and steel wires. Chayote is part of the local popular diet, but increasingly also exported to the USA to satisfy demands from immigrant communities.
 5. See Sáenz-Segura (2006) for additional details on the statistical and econometric analysis for both case studies.
 6. This function is intimately related to the insurance role of contracts, since farmers would only invest on their plantations, and thereby increase their asset-specificity, if they have the certainty regarding market outlet and price.
 7. Leakage (deviation of input use to other crops) was not a major issue in this study, since most inputs only have a specific use. Re-sales to other farmers could occur, however, at the expense of lower quality compliance.
 8. In the pepper case the maturity of bunches is assessed by sight (one or two red grains per bunch), whereas in the chayote case quality mostly refers to product uniformity (basically size, shape and colour).

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