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Contract Farming and Other Market Institutions as Mechanisms for Integrating Smallholder Livestock Producers in the Growth and Development of the Livestock Sector in Developing Countries

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PREFACE

This is the 45th of a series of Working Papers prepared for the Pro-Poor Livestock Policy Initiative (PPLPI). The purpose of these papers is to explore issues related to livestock development in the context of poverty alleviation.

Livestock is vital to the economies of many developing countries. Animals are a source of food, more specifically protein for human diets, income, employment and possibly foreign exchange. For low income producers, livestock can serve as a store of wealth, provide draught power and organic fertiliser for crop production and a means of transport. Consumption of livestock and livestock products in developing countries, though starting from a low base, is growing rapidly.

Over the last two decades, structural transformation in the agricultural sector of developing countries has seen the spread of contract farming in the production and marketing of agricultural products, in general and of livestock products in particular. The main objective of this literature review is to determine the extent to which contract farming scheme enable smallholder livestock producers to gain market access, and explore variants of this market institution for more effectively integrating smallholders into the growth and development of the livestock sector in developing countries.

We hope this paper will provide useful information to its readers and any feedback is welcome by the author, PPLPI and the Livestock Information, Sector Analysis and Policy Branch (AGAL) of the Food and Agriculture Organization (FAO).

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Keywords

Structural transformation, contract farming, high-value products, supermarkets, smallholder livestock producers, transaction cost, market access, developing countries, informal contracts.

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EXECUTIVE SUMMARY

The active and sustainable participation of smallholder livestock producers in the rapid growth and development of the livestock sector in the international arena is seen as bringing about a potential pathway for rural income growth and poverty alleviation in developing countries. However, the route by which these smallholders can get truly involved and take advantage of opportunities in the growing livestock markets is not too clear as there exists a host of barriers to their participation that smallholders, on their own, find difficult to overcome.

Over time, structural transformation in the agricultural sector of developing countries has seen the emergence and spread of contract farming in the production and marketing of agricultural products, in general and of livestock products in particular. The main objective of this literature review is to determine the extent to which contract farming and its variants enable smallholder livestock producers to gain market access, and explore other market institutions for more effectively integrating smallholders into the growth and development of the livestock sector in developing countries.

Section 1 of this paper expounds on the rationale and underlying theoretical framework for the emergence of contract farming with focus on the transaction cost economics approach. Section 2 reviews the literature on the general applications of contract farming and the transaction cost economics framework in agricultural commodities. The main drivers of structural change in agriculture are traced and linked to supply chains and the formation of alternative governance mechanisms that include contract farming. In Section 3, we highlight the trends and typologies of contracts in developing countries. Particular attention is given to case studies on contract farming in livestock in selected countries of India, Thailand, Vietnam and the Philippines. The livestock products discussed include dairy (milk), poultry and pigs. Section 4 gives an assessment of the efficiency and effectiveness of contract farming and its variants as an institutional mechanism for enhancing smallholder producers' access to markets and services for their products, their competitiveness, and their capacity to earn income. Section 5 concludes and proposes areas that need further investigation.

Rationale and Framework

The literature provides various definitions of contract farming, but generally, they refer to a binding arrangement between two parties consisting of an agro-processing firm (contractor) and an individual producer (contractee) who may be one among other farmer contractees of the firm. They engage in 'forward agreements', with well-defined obligations and remuneration for task done, often with specifications on product properties such as volume, quality, and timing of delivery. This arrangement basically permits the firm to exercise influence on production processes that are delegated to independent farms in a manner that is consistent with its objectives.

The theoretical underpinnings of the phenomenon of contract farming are traced to competing and complementing schools of thought in the economic theory of firm behaviour, property rights and agency behaviour, and industrial organization. In the literature on contract farming, the dominant theoretical framework is transaction cost economics (TCE), following the seminal works of Coase (1937) and Williamson (1979; 1985; 1989), and expounded on by the proponents of the New Institutional Economics (NIE) school, which extends economic theory by giving recognition to the important role of the social and legal norms and rules that underlie economic activity.

Traditional neoclassical economic theory assumes that under conditions of perfectly competitive markets, anonymous economic agents, in the act of voluntary market exchange in pursuit of their own interest, arrive at independent decisions that result in the maximization of gains from trade. Under this environment, the price mechanism bridging supply and demand decisions provides all the information that economic agents need to know. Transaction costs are ignorable, and the 'Invisible Hand' of the market will coordinate individual actions so as to arrive at a socially efficient welfare maximizing solution. Under these conditions, it is in the interest of economic agents to transact everything through classical market transactions (spot market).

In contrast, TCE asserts that economic agents are rationally bounded (there is incompleteness and asymmetry of information) and tend to be opportunistic. Under these conditions, market transactions are fraught with hazards, and measures undertaken by economic agents to mitigate the losses entail costs - transaction costs. The level of transaction costs is influenced, among others, by three transaction characteristics: uncertainty, asset specificity, and frequency of exchange. Where there is uncertainty on the probable action of the other party in an exchange transaction, assuming opportunistic behaviour, transaction costs ensue in undertaking measures to search for more reliable trading partners, negotiating for better terms, and enforcing agreements.

Asset specificity occurs when an economic agent undertakes an investment to engage in a particular economic activity meant for a particular market exchange. While the value of the asset is maximized in that exchange agreement, its value diminishes outside that particular transaction. The undertaking of highly specific investments is prone to 'hold-up' situations when an opportunistic partner to the trade reneges on the agreement for the purpose of extracting quasi-rents. Measures to protect the value of specific investments entail transaction costs.

Frequency of exchange, by itself, does not provide a unidirectional relation with the level of transaction costs. When dealing with homogeneous goods and services produced through the use of non-specific assets, it does not matter much if the exchange happens only occasionally, or the exchange is recurrent. For such products, all information is provided by the market and trade can be made whenever the occasion demands, and consequences are borne by each party without incurring high transaction costs. Combined with asset specificity, however, the connection between frequency and transaction cost comes out. When transactions need to be recurrent, the greater become the chances of one party to behave opportunistically.

TCE asserts that when transaction characteristics are such that direct market exchange entails prohibitively high transaction costs, it is more efficient for the firm to undertake the production of the good that it requires for its own economic activity, i.e., to vertically integrate. The decision to organize economic transaction either directly through spot markets ("buy") or by vertically integrating ("produce"), however, are two extremes, and are not the only options available to economic agents.

The development of the TCE literature has led to the construction of transaction coordination models in between these two polar points, generally termed as "hybrids". Between the two extremes could be located three other categories of transaction organization options, arranged according to diminishing importance of the market's 'Invisible Hand' (increasing importance of internal or 'hierarchical' control). These are, respectively, (i) Specification contracts, (ii) Strategic alliances, and (iii) Formal bilateral cooperation. Along this framework, TCE asserts that profit-maximizing agents, with the production technology at their disposal (and the underlying production costs) and transaction characteristics of the exchange (and the entailing transaction costs), will choose a particular organization of economic activity that minimizes the sum of production and transaction costs.

The TCE approach to explaining contracts, however, is not without criticism from other schools of thought. In particular, the assumptions of the TCE framework have been criticized because of its overemphasis on transaction costs. Since transaction costs are not tangible, they could not lend themselves to direct measurement for verification. The crucial assumption of opportunistic behaviour is also challenged by the existence of enduring social relations that are based on trust developed through repetitive transactions. Notwithstanding the criticisms, the TCE remains to be the dominant approach used in the literature in investigating the contract farming phenomenon.

General Applications of Contracts in Agricultural Commodities

The current literature on contract farming is set on the more general literature on the emergence of supply chains in the context of the growing commercialization of agriculture that is triggered by the structural transformation of this sector in developing countries. Among the main drivers of this transformation are the changing demand conditions brought about by increasing per capita incomes and urbanization. These in turn bring about changes in the composition of the food consumption basket (diet) with increasing demand for higher-value products, product quality, food safety, and convenience. On the supply side are technological changes toward more efficient farm production and food processing, exploiting economies of scale where they apply. Both changes in demand and supply conditions are set within a globalizing trade environment, where industrialized and developing country markets are becoming more closely integrated. On the distribution side, the emergence of supermarkets in developing countries, in varying degrees of reach and diffusion via domestic and foreign direct investments, has created innovative and efficient forms of procurement of agricultural products. These innovations are also facilitated by the advancements in information technology to more quickly respond to changes in consumer demand and preferences in domestic urban markets, if not global markets as well.

The modernization of supply chains and their linkages to major urban and export markets has induced new relationships between processing enterprises and individual farmers. For greater competitiveness, each function along the supply chain must be linked by better-organized services in technology use in production, transport and marketing of products. But apart from improving efficiency in product transformation, a key to greater competitiveness is the reduction of transaction costs at each stage. This creates a need for tighter control of the processing firm over production processes and inputs at the farm level and all along the supply chain. This would consequently entail a new set of rules and regulations for governance by institutions as well as markets.

Under a commercializing and globalizing agriculture, the drivers of structural change induce a movement from the markets for homogeneous traditional commodities toward the markets for specialized or highly differentiated goods. Dealing with products and product characteristics lead to various configurations of transaction characteristics (asset specific investments, buyer and seller uncertainty, and frequency of transactions) which point to alternative governance structures that could reduce transaction costs.

Applications of contract farming in agricultural supply chains in developing countries are found in transactions dealing with high-value products such as fruits and vegetables, destined either for export markets or supermarkets in highly urbanized centres. The Perishability and related characteristic of quality generate uncertainty in the transactions. Perishable products must be moved quickly and transacted frequently. When product quality becomes an important issue in market exchange, a buyer is confronted with uncertainty over the product quality particularly when quality is not readily recognizable in the form of the transacted product, and known

only when the product is subsequently subjected to processing or is consumed. On the other hand, the seller is confronted with uncertainty over the price received for supplying a higher-than-normal quality of product. When the spot market fails to recognize product differences, and fails to award proper price premia to higher-quality products, economic agents would look for other governance mechanisms that more efficiently solve the problems posed by uncertainty.

The production and marketing of differentiated products, catering to particular preferences of higher-income urban consumers or export markets also induce the undertaking of asset-specific investments focused on the production and supply of these products. Committing such investments, however, subjects the particular economic agent to risks of hold up by the possible opportunistic behaviour of trading partners in a market transaction. Mitigating against such risks induces a search for alternative governance mechanisms by an agricultural enterprise to lower transaction costs.

Addressing the problems posed by transaction costs poses a particular challenge in less developed country settings where in general, the marketing and institutional infrastructures and services that link various parts of the supply chain for agricultural products are not that smoothly functioning. These impose barriers on the flow of trade from farm production, particularly in rural areas, to the major centres of demand. The existence of market failures or public goods provision failures between any two exchange points along the supply chain raises transaction costs, creating barriers to market exchange. Thus, the importance of the search for more efficient modes of governance to conduct agricultural and marketing transactions.

Trends and Typologies of Contracts in Developing Countries

The documentation of contract farming as early as the first half of the 20th Century refers mostly to the engagement in vertical coordination by agribusiness enterprises in the industrialized countries in North America and Western Europe, particularly in the production and processing of vegetables and fruits. Contract farming in poultry, and then later in hogs, followed suit in the second half of the last Century. In the US, the poultry industry is almost fully vertically coordinated via contracts. In the EU, contract arrangements had been encouraged by the production systems that evolved under the EU Common Agricultural Policy, where the volume of output and quality of products are tightly controlled, particularly in highly perishable products such as dairy and poultry, fruits and vegetables. In Asia, the earlier adopters of vertical coordination in poultry were Japan and South Korea.

In the less developed countries in Latin America, Asia, and Africa, the exact origins of contract farming are difficult to trace. Earlier practices of vertical coordination appeared to have been related to the operations of transnational agribusiness companies or state-owned enterprises in the plantation sector producing commodities destined for export markets such as banana, tea, tobacco, sugar, oil palm, and rubber. In the midst of the macro-economic structural adjustments programmes that quite a number of developing countries underwent in the second half of the last Century, government support to market intermediation in heavily traded commodities were discontinued, and many state-owned enterprises collapsed. The changing conditions in the global market for commodities also induced a restructuring of the organization of agribusiness in plantation crops. From the operation of large single plantations, a shift had been observed in favour of production through contracts that reduced the risks to investments in large tracts of land and farm equipment by large agribusiness enterprises.

The more recent spread of contract farming in developing countries appears to have followed also the path that Reardon (2006) describes as the three 'waves' of diffusion

of supermarkets by multinational agri-food companies in Latin America, Asia, and Africa. This link is not far-fetched as the diffusion of supermarkets also brought about the spread of new procurement strategies by these enterprises to secure the supply of a consistent volume of high quality agricultural products destined for domestic urban centres and even for export markets.

In the literature, there are certain types of farm products that were more amenable to vertical coordination than others. There is no one-to-one correspondence, however, as the production and marketing of these products should be taken in the context of the given market and institutional environment in developing countries. These products either have one or more of the following characteristics: high perishability, high quality specificity, high labour intensity, and high value-to-weight ratio. Generally, these products include those destined for export markets and products that require traceability and/or food safety certification even if they are destined for the domestic markets.

In the contract farming literature, the TCE framework is extensively used in linking combinations of agricultural transaction characteristics (uncertainty, asset specificity, frequency) with the more likely 'hybrid' vertical coordination governance categories (Specification contracting, Strategic alliance, Formal bilateral cooperation). The first two belong to the general category of 'Neoclassical Contracting', while the third belongs to the category of 'Relational Contracting'. In developing countries, most contract farming schemes fall under Neoclassical contracts where the integrator company (contractor) and the farmer (contractee) maintain their respective status as autonomous economic agents. Relational contracts were rare.

Under the category of Neoclassical contracts, the literature also identifies types of contract farming according to which information asymmetry or market access barrier (market failure) the vertical coordination mechanism addresses. These types also indicate the intensity of involvement or control of the integrator company in the production activities of the farmer. These are the i) market specification contract, ii) management-providing contract, and iii) resource-providing contract. These types, however, are not necessarily exclusive. A particular contract may be placed in one of the types, but may contain some features of another. The straightforwardness or complexity of the features of the integrator's involvement in the farmer's production activities could then be related to the categories of governance of transaction coordination according to greater farmer autonomy on the one hand, or tighter hierarchical control on the other.

Contract Farming in Country Case Studies

In the case studies on contract farming in livestock in the selected developing countries of India, Thailand, Vietnam, and the Philippines, the products engaged in were dairy, poultry and pigs. Contracts were either formal (written) or informal. Formal contracts, in terms of their specific provisions, were of two types: (i) fixed-fee or wage contracts, and (ii) forward-price or profit-sharing contracts. Most fixed-fee or wage contracts had the properties of a 'resource-providing' contract, with also some features of a 'management-providing' contract, with intensive supervision of the production processes at the farm by the integrator company. Forward-price and profit-sharing contracts have closer relations to a 'market-specification' contract, but with certain features of a 'management-providing' contract from the receipt of the farmer of livestock services from the integrator.

In industrial-type broilers, in all relevant countries, formal contracts between integrators and farmers dominate over informal contracts. Formal contracts involved mostly large-sized farms (>10,000 birds per cycle/farm). Strict rules govern volume of inputs provided by the integrator and volume of output turned out by the farmer, with

also provisions on some quality specifications on individual bird output. Integrators have proprietary rights over the technology, inputs, and output.

In milk production, both formal and informal contracts exist. In Thailand and Vietnam, where the dominant final product is ultra-high temperature (UHT) processed milk for urban consumers, processors engage in strictly defined formal contracts with farmers, with scale of production depending on the predominance of small, medium or large producers in the area of coverage. In India, outside the contracts within cooperatives, the emerging contracts involve processing companies who engage in a formal contract with an intermediary (collector) in the supply of fresh milk, while the intermediary engages in informal contracts with farmers, mostly smallholders.

In pig production in Thailand, Vietnam and the Philippines, contracts exist for industrial-type hogs. Formal contract growing, however, is not yet the norm even in Thailand which has the more advanced pig industry among the three countries. Unlike in broiler chicken where the sources of day-old-chicks and formula mixed feeds are controlled by the few large broiler integrators, there are alternative sources of commercial breeding and fattening stock in pig raising, and there are alternative sources of feeds or feed ingredients. In all countries, formal contracts involved larger-scale farms (>100 heads per cycle per farm). In contrast with the other countries, in the Philippines, there are formal contracts involving smallholders (20-80 heads of pigs per cycle per farm) and a medium-sized feedmilling-livestock trading - meat processing cooperative. While the contracts are formal (written), the contract does not typify the usual big company - large farm contract, between two impersonal parties pitted against each other. Rather, social relations are relatively informal, and the trust level between the smallholder pig producers and the cooperative is relatively strong, cultivated after years of repeated successful transactions, with the cooperative located in the same peri-urban area as the surrounding villages where the farmers are. Moreover, the smallholders are themselves members of the same cooperative, and thus have a stake in the institution itself.

In Vietnam, informal contracts exist with cooperatives and with input and/or output traders in the production of industrial-type pigs. For indigenous pigs, informal contracts exist between pig producers and output traders. While members of pig raising cooperatives mostly involve larger-scale producers, those engaged in informal contracts with traders tend to be mainly smallholders.

Thus, there are similarities as well as differences in the nature of the contracts in the case countries. These varied depending on the length of history and level of development and maturity of formal contract relations in the countries and on the strength of the legal and institutional framework to enforce contracts. They also varied according to the nature of the product in terms of the appropriation of the benefits to the employed technology by the integrator, the target markets for the output, as well as the dominant scale of production of the commodity in each country or location within a country.

The existence and persistence of informal contracts between traders and farmers are based mainly on social capital and trust, where repeated satisfactory transactions reduce uncertainty and build reputation, thereby also effectively reducing transaction costs.

Assessment of the Efficiency and Effectiveness of Contract Farming as Market Linking Institutions for Smallholder Livestock Producers

Nature of Contracts

In the case countries of India, Thailand, Vietnam and the Philippines, the nature of livestock production contracts engaged in by the integrator and the farmer differs according to the product in question in the transaction. Yet even for the same product, there are variations across countries that tend to be driven by the changing needs of the markets on certain product attributes, types of transaction costs that need to be hurdled, and the distribution of power between integrator and farmer.

In formal contracts, the terms are adaptations of contract growing agreements in industrialized countries, and modified according to the institutional environment in developing countries concerned. Contracts are mainly in the form of fixed-fee or wage contracts, with some forward-price or profit-sharing contracts. Under fixed-fee contracts, the integrator provides all intermediate inputs required to produce the output. The standard input-output ratios and quality attributes are stipulated. The farmer is then paid an agreed upon fee in exchange for his labour, management, and use of facilities. The integrator assumes the market risks of changes in input and output prices. On the other hand, production risks impact on both parties.

Under forward-price or profit-sharing contracts, the integrator still provides the intermediate inputs but on credit at agreed-upon prices. The cost of these inputs is then charged to the farmer when the output is sold. A minimum forward-price of output could be guaranteed to the producer. Under profit-sharing contracts, the prevailing market price for the output at the time of sale is used. The profit is split between the two parties, with both assuming the market risks. Production risks are shared, so there is incentive for both parties to aim for maximum activity profit.

Formal contracts in broiler production are mainly of the fixed-fee type in India and the Philippines, but have shifted to guaranteed forward-price contracts in Thailand. In pig production in Thailand, Vietnam and the Philippines, contracts with large-scale producers (>100 hogs per cycle per farm) are dominantly fixed-fee contracts. Formal contracts between smallholder pig producers and a cooperative in the Philippines are profit-sharing contracts.

In informal contracts found in the production and marketing of dairy in India and pigs in Vietnam, the terms of agreement are more difficult to neatly categorize. They are, however, closer to variations of profit-sharing contracts rather than fixed-fee contracts. In the dairy case in India, the contract offers the guarantee of supply of intermediate inputs, livestock services, and market outlet for the smallholder producers, in exchange for the guarantee of supply of milk to the processor, through its intermediary. In the case of pig production in Vietnam, the agreement lies more in the guarantee of supply of intermediate inputs to the farmer. Some agreements guarantee the marketing of the output, but most leave the producers on their own.

In general, for formal contracts, when integrators are dealing with larger-scale farmers, fixed-fee contracts are offered, and integrators exert quite a heavy market power, shifting as much production risk to the producer. When producers have sufficient capacity to manage and control their production performance, guaranteed forward-price contracts emerge.

Informal contracts are mainly undertaken by smallholders with market intermediaries in the interest of getting assured supply of intermediate inputs and livestock services on credit. Guaranteed outlet for the output could be an additional feature, but with the exception of dairy in India, it is often a missing component.

Determinants of Participation in Contracts

Except in industrial-type broiler chicken production in Thailand and in the Philippines, formal contracts are not yet the norm in the production of livestock products in all the case countries examined. Although independent smallholder livestock producers perceive benefits and advantages in engaging in contract production, the reasons for not being engaged in one pointed to perceptions on the non-existence of such offers in their own localities. If these offers existed, certain household and farm characteristics did not make them qualify to be chosen, among which is the small-scale of activity.

Econometric estimation of the determinants of participation in formal contract farming in the case countries examined did not yield uniform directions of impact of significant factors influencing participation or non-participation. In pig production in Vietnam, the characteristics of low educational attainment, non-specialization in pig production, and small-scale of operation, act as barriers to participation. In India, after achieving a particular scale of production, gaining more experience in the activity, and having the support of non-farm income sources, producers tend to shift back to being independent producers, possibly indicating that the terms of the contract were too stifling.

In informal contracts, there are also no common and uni-directional determinants of participation. In dairy production in India, greater experience in dairy production appears to be a human capital asset valued by integrators. In pig production in Vietnam, farmers who are more likely to engage in informal contracts with a cooperative are those with higher levels of education, greater experience in pig production and specializing in the activity, and those who are farther away from the market centres.

In general, participation in contract farming reflects two sides of the coin: the hurdling of physical and human capital qualification barriers put up by the integrator, and the valuing by the farmer of the services provided by the contract arrangement as opposed to undertaking the production and marketing of the product independently. Even when options are there to engage in contracts, if the farmer deems he has what it takes to undertake the production and market risks on his own, and reap the entire fruits of the activity, he may prefer to operate as an independent producer.

Efficiency of Contract Farming

Transaction cost economics, in its treatment of the resort to vertical coordination of operations, asserts that when transaction costs are significant, economic efficiency gains could be derived from vertical coordination rather than engaging in spot markets. These could be reflected in gains in physical productivity, reduction in costs per unit of output, and gains in net returns per unit of output. Reduction in uncertainty of quality of output could also lead to the capture of the corresponding price premia by producers or suppliers.

Comparison of net returns per unit of output between contract farmers and independent producers in dairy, broiler chicken and pigs in the case countries have mixed results, although there are more instances where the advantage was on the side of the contract farmers. The cases where the reverse position occurred were in broiler contracts in India. This is consistent with the results in the determinants of participation where those with better human and physical assets, and with higher scale of operations, were independent producers. Those with lesser means could get into the economic activity with the assistance of contracts, but at a price. In Vietnam, the comparative performance varied by type of pig production activity, and on whether exotic or mixed breeds of pigs were used. In general, participation in contracts, whether formal or informal, induced greater adoption of exotic breeds of pigs. The net income advantage of contract farmers, however, was more consistent in the raising of mixed breeds rather than with exotic breeds.

Effectiveness of Contract Farming

Within the context of the increasing global integration of agricultural markets, the development of supply chains in international trade, and the diffusion of supermarkets in developing countries, contract farming has often been looked upon as a system that could integrate smallholder producers in rapidly developing mainstream markets. The effectiveness of contract farming arrangements as an institution could be viewed from the perspective of their success in involving smallholders in such schemes. However, the investigation on effectiveness should not just stop at the mere inclusion of smallholders, but must also assess whether the engagement in such schemes were, on the whole, beneficial for such households rather than lead them to lesser incomes, or even to impoverishment.

It is unfortunate, though, that there is very scant literature that investigates the effectiveness of contract farming in livestock products along these lines. A limitation in the literature on the impact of contract farming is that, while most smallholder livestock production in developing countries takes place under mixed crop-livestock production systems, most of the studies focus solely on the performance of the livestock activity undertaken under contract. Under conditions where various farm activities compete for limited household labour and other resources, improvements in income from more intensified livestock production under contract may lead to a reduction in household resources used in the other economic activities. This could then lead to a corresponding reduction in income in these other activities. Of the few studies available, one is not on livestock but on fruits and vegetables in China, where contract farming does improve incomes both at the activity level and at the household level. Another study is on informal contracts in pig production in rural Vietnam, where contracts improve pig production income but the same conclusion cannot robustly be said about the total household income level. The conditions under which one or another outcome is achieved could be the subject of deeper investigation.

Another angle that could be pursued is to look at the longer term impacts of engagement in contracts on activity performance, i.e., the stability of incomes derived over time. The literature on contract farming in developing countries is not yet rich along these lines. There are a few literature in the US broiler industry in particular, with perceptions of an imbalance in the terms relating to the distribution of production risks as unfairly tilted against growers, where contracts were on an annual basis, with no certainty for renewal. Notable is that these are documented cases in an industrialized country setting where the nuances of contract growing are already very much advanced, and the legal framework for contract enforcement is already one of the most sophisticated. In less developed countries, one can assert that the terms of formal contracts in broiler and industrial-type pig production are even more tilted in favour of the integrators as they could put to their advantage the asymmetry of information about the markets over producers, and exploit their stronger bargaining position over individual farmers, where the legal and institutional framework to enforce contracts is relatively weak. The perceptions by formal contract growers of the inequity of terms is confirmed in the case studies on broiler contracts in India and in Thailand, and fixed-fee contracts in industrial-type pig production in northern Vietnam. In Thailand, the shift toward guaranteed forward-price contracts in broiler production appears to have stemmed from the dissatisfaction with the fixed-fee contracts. In all cases, however, contract growers indicated preference for continued engagement in formal contracts, albeit with more favourable terms.

Finally, a third angle in investigating the effectiveness of contract farming as a system that integrates smallholder livestock producers into the growing mainstream markets is determining whether or not contracts exhibit a scale bias. In the case countries compared, for formal contracts in broiler and industrial-type pig production, it was often the case that there were minimum capital and scale requirements, the size of which varies depending on the level of development of the particular industry and on the predominant scale of production in each country. For informal contracts, there is

generally a greater flexibility by market intermediaries in accommodating smallholder producers, as evidenced in dairy contracts in India and in pig production in northern Vietnam. In these cases, the 'reputation' on the ability of producers to keep the agreement carries greater weight than simply the scale of production of the farmer.

There are, however, cases of formal contracts in fruits and vegetables, and also in industrial-type pigs in a few countries, where integrators do engage in contract with smallholders. In these cases, it is the human capital and the quality of physical assets to successfully undertake the activity that mattered, rather than the scale of production *per se*. In addition, the proximity between the integrator and the farmer, the social capital that connects the two parties to the contract, and the element of trust provide for enduring production-marketing relationships. These cases, however, are the exceptions rather than the norm.

Conclusion and Way Forward

The theoretical bases of the transaction cost economics framework of the analysis of the resort to vertical coordination rather than through spot markets in transactions governance are quite on firm ground. Competing as well as complementary approaches also exist and are recognized. However, while the theoretical literature points to an array of alternative vertical coordination schemes according to the degree of hierarchical governance in transactions, the literature on the applications of contract farming in agriculture and in livestock production have dominantly concentrated on one form of coordination mechanism - the formal contract between and integrator company (contractor) and the farmer (contractee).

The focus on formal contracts is directly linked to the growing importance given to the analysis of high-value agricultural supply chains in their role of responding to structural changes being brought about by the increasing globalization of agriculture and the emergence of supermarkets, and the concern on how smallholder producers in developing countries can be included in domestic and international trade, in a regime where standards on product quality and food safety are increasingly coming into play. Under these conditions, attention is given on how contract farming accomplishes a number of tasks related to the consistency in delivering a required volume of the output, producing a product with particular quality attributes such as freshness, uniformity, texture and taste, among others. Other requirements may include that products are certified to have passed food safety standards, or that they have been produced in an environmentally friendly manner.

The literature on the various applications of contract farming in crops and in livestock, indicate that in general, contract farming is an important mechanism in its relative success in accomplishing the tasks as laid out above, and in delivering the products demanded by export markets, as well as high-end markets in the domestic scene, as mediated by the growing supermarkets in developing countries. On the side of the contract farmers, most of the studies do point to the greater access to high-quality inputs and services, and higher activity net returns per unit of output registered by contract growers as compared to independent farmers producing the same product, although there are cases where the reverse has been exhibited with respect to net returns.

In terms of the effectiveness of contract farming in integrating smallholder livestock keepers in mainstream markets in developing countries, the literature reveals that in general, formal contracts between integrators and contract farmers tended to select the larger-scale producers. Under situation-specific conditions, however, where the dominant production scale is small, integrators do have to contend with engaging into contract with smallholders, but screen them according to their physical and human capital, i.e., their capacity to deliver the required output.

On whether contract farmers obtain longer-term benefits in terms of the sustainability of net returns, the scant literature that has explored this has mixed results. In general, these are country-specific, depending on the relative distribution of market power between integrator and the farmer, the level of development of the institutional and legal system in the enforcement of contracts, and the latitude of options of farmers as conditioned by their physical, human and social capital to undertake production independently or engage in contracts with other parties.

The review also concludes that there are very few studies that have explored informal contracts between smallholder livestock producers and their intermediaries. In the context of integrating smallholder producers in developing countries to mainstream markets, the richness of analyses on formal contracts involving high-value products and high-end markets also mirrors a gap in knowledge and understanding on the extent to which informal forms of vertical coordination lower transaction costs, efficiently link producers to markets that are vital to their livelihoods, and increase their incomes.

The review proposes that this glaring gap in the context of developing countries be addressed by refocusing the field of investigation on two inter-related areas where smallholder livestock producers predominate as stakeholders. These are: (i) contracts outside the boundaries of formal contract growing schemes, and (ii) differentiated livestock products outside the narrow confines of high-value industrial-type products for export markets and supermarkets.

In developing countries, forms of informal contracts were seen to be more prevalent. The richness and sophistication of the methods in the literature to analyse formal contracts could be adapted and modified to investigate informal contracts. Particularly in rural settings, the formal institutions and legal framework for enforcing formal contracts are not yet that firmly developed. Within this context, the stability of economic transactions are strongly influenced by trust-based relationships built upon the increasing frequency of successful transactions, by the negative impacts of social sanctions on breaching trust, and by the high cost of searching and switching to other transaction partners who may offer higher returns, but may end up to be less reliable. Deeper investigation on more informal forms of contracts could take these deeply-rooted social norms and explore their potentials as social capital that smallholders and their contract partners can exploit in the development of alternative market institutions that could efficiently and equitably raise the level of market access by smallholder livestock producers beyond those that are obtainable from infrequent and incompletely-informed transactions in traditional market exchanges. One of the informal institutions that could be the subject for deeper investigation on its economic and social functions in market intermediation and in addressing transaction cost problems with smallholders is the 'farmer organization'.

The area of high-value livestock products for exports and for supermarkets has traditionally not been the realm of the vast majority of smallholders. This is not expected to radically change in the near future gauging from the distance between sophisticated capacities needed to meet formal standards for product quality and food safety and the capacity of smallholder livestock producers and the standards prevailing in informal market institutions which they rely upon to engage in trade with their products. On the other hand, there is that large part of domestic market demand for livestock products by significant sections of households in main urban centres as well as regional markets, toward which most smallholder production is directed. For these consumers, demand for qualitatively differentiated products is also expressed in terms of their willingness to pay a price premium to obtain livestock products with distinct quality characteristics (freshness, taste, flavour, texture, among others) that normally associated with non-industrial-type of livestock breeds or production processes. The growth of such domestic markets for differentiated livestock products, and the development of alternative institutional market arrangements that would more efficiently communicate information on product differentiation (quality,

production process, food safety), and a system to guarantee credibility of such qualitative differences, should work to create value where it is sought. This should provide incentives for smallholders to create greater value in the livestock activities that they currently undertake. At the same time, the development of such domestic market would also offer consumers of all income brackets a wider range of livestock products to choose from, not just between supermarket brands.

1. FRAMEWORK AND RATIONALE FOR CONTRACT FARMING IN AGRICULTURAL COMMODITIES

There is a vast amount of fairly recent literature reviews on the theoretical underpinnings of contracts and transaction costs presented by authors such as Baumann (2000), Eaton and Shepherd (2001), Hobbs and Young (2001), Simmons (2002), Kirsten and Sartorius (2002), Da Silva (2005), Masakure and Henson (2005), Tiongco, et al. (2006), and Sartorius and Kirsten (2007), among others. These studies have built on the theoretical works of Coase (1937); Mighell and Jones (1963) and Williamson (1979; 1985; 1989; 1996), and further pursued empirically by Minot (1986), Glover and Kusterer (1990), Little and Watts (1994), Watts (1994), Runsten and Key (1996), Rehber (1998), Key and Runsten (1999), and Delgado et al. (1999).

The literature provides various definitions of contract farming but generally, they refer to a binding arrangement between two parties consisting of a private agro-processing firm or a state-owned enterprise (contractor) and an individual producer (contractee) who may be one among many other farmer contractees of the firm. They engage in 'forward agreements', with well-defined obligations and remuneration for work done, often with specifications on product quality, quantity and timing of delivery. This arrangement basically permits firms to exercise control or influence on production processes that are delegated to independent farms in a manner that is consistent with its objectives

In principle, two parties enter into a contract because the agreement is perceived to be mutually beneficial, at least in the initial stage of the exchange. The development of empirical evidence over time, however, would show conflicting views that stem largely from the issue of power balance and equitability of the distribution of benefits as well as value added derivable from contract farming.

The theoretical underpinnings of the phenomenon of contract farming are traced to competing schools of thought in the economic theory of firm behaviour, property rights and agency behaviour, and industrial organization. In particular, they are drawn from alternative approaches to explaining why firms vertically integrate ('produce') as opposed to directly transacting with the market ('buy') in obtaining the goods or services that they require for their own economic activity. Peterson and Wysocki (1998) and Hobbs and Young (2001) present diverse views coming from various areas such as agency theory, transaction cost theory, strategic management theory, competency/capabilities theory, and resource based theory, among others. Joskow (2003) provides an extensive review of the literature on vertical integration, and notes that in the last quarter of a century, the transaction cost economics (TCE) framework has stimulated much more empirical work to enrich the theoretical approach than either the traditional neoclassical theories or the more recent property rights literature.

From the viewpoint of traditional neoclassical economics, vertical integration is related to the existence of market imperfections linked with market power, economies of scale, and overcoming problems associated with free-rider behaviour and uncertainty. Vertical integration is a decision that a firm can make to capture quasi rents from a related economic activity which otherwise could be undertaken separately. The property rights school, associated with the seminal work of Coase (1937), and transaction cost economics, pioneered by Williamson (1979, 1985), although distinct strands of thought, are closely linked in the development of the New Institutional Economics (NIE) in the analysis of market transactions and hierarchical governance within the firm.

In the literature of contract farming, the dominant approach for analysing contract arrangements is likewise the TCE (Minot, 1986; Delgado, et al., 1999; Runsten and Key, 1996; Kirsten and Sartorius, 2002; Tiongco, et al., 2007; Bakucs et al., 2007).

Transaction cost economics asserts a different trading environment faced by market participants from that assumed in neoclassical economic (NCE) theory. In NCE with perfectly competitive markets, anonymous economic agents, in the act of voluntary market exchange in pursuit of their own interest, arrive at independent decisions that result in the maximization of gains from trade. Under the neoclassical market environment, the price mechanism bridging supply and demand decisions provides all the information that economic agents need to know. Transaction costs are ignorable, and the 'Invisible Hand' of the market will coordinate individual actions so as to arrive at a socially efficient welfare maximizing solution. Under these conditions, it is in the interest of economic agents to transact everything through classical market transactions (spot market).

In contrast, TCE asserts that economic agents are boundedly rational (there is incompleteness and asymmetry of information) and tend to be opportunistic. Under these conditions, market transactions are fraught with hazards, and measures undertaken by economic agents to mitigate the losses entail costs - transaction costs. The level of transaction costs is influenced, among others, by three transaction characteristics: uncertainty, asset specificity, and frequency of exchange.

Where there is uncertainty on the probable action of the other party in an exchange transaction, assuming opportunistic behaviour, transaction costs ensue in undertaking measures to search for more reliable trading partners, negotiating for better terms, and enforcing agreements.

Asset specificity occurs when an economic agent undertakes an investment to engage in a particular economic activity meant for a particular market exchange. While the value of the asset is maximized in that exchange agreement, its value diminishes outside that particular market exchange. A firm's assets can take various forms: physical (machinery), spatial (business location), time (perishability of product) and human capital (acquired knowledge and skills). The undertaking of highly specific investments is prone to 'hold-up' situations when an opportunistic partner to the trade reneges on the agreement for the purpose of extracting quasi-rents. Measures to protect the value of specific investments entail transaction costs.

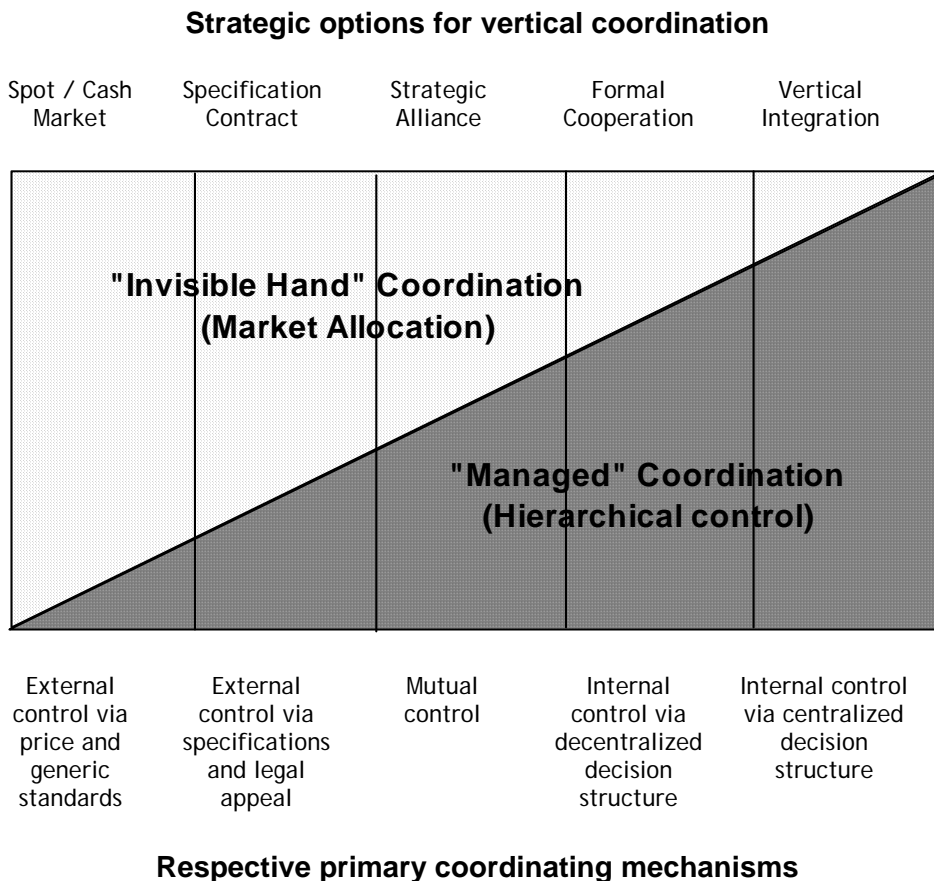
Frequency of exchange, by itself, does not provide a unidirectional relation with the level of transaction costs. Combined with asset specificity, however, the connection with transaction cost comes out. When dealing with standard (homogeneous) goods and services produced through the use of non-specific assets, it does not matter much if the exchange happens only occasionally, or the exchange is recurrent. For such products, all information is provided by the market and trade can be made whenever the occasion demands, and consequences are borne by each party without incurring high transaction costs. Even when transactions need to be made frequently for the same standard product, the higher frequency of transaction generates more information about the transaction and repeated successful transactions reinforce reputation between economic agents.

In explaining the phenomenon of vertical integration, TCE asserts that when transaction characteristics are such that direct market exchange entails prohibitively high transaction costs, it is more advantageous and efficient for the firm to undertake the production of the good or provision of the service that it requires for its own economic activity, i.e., to vertically integrate. The decision to organize economic transaction either directly through spot markets ("buy") or by vertically integrating ("produce"), however, are extremes, and are not the only options available to economic agents. While internal governance in vertical integration may be superior in settling conflicts of interest and opportunistic behaviour within a hierarchy, the vertically integrated firm also has to contend with other costs that emerge from the inertia of bureaucracy, slowing down the firm to respond to market signals arising from the dynamically evolving market environment.

The development of the TCE literature has led to the development of transaction coordination models in between these two polar points, generally termed as "hybrids". Within this framework, it is asserted that profit-maximizing agents, given the production technology at their disposal (and the underlying production costs) and transaction characteristics of the exchange (and the entailing transaction costs), will choose a particular organization of economic activity that minimizes the sum of production and transaction costs.

Williamson (1979) offers four discrete forms of transaction organization that fit certain combinations of transaction characteristics. From the most decentralized governance through spot markets to complete hierarchical governance, the forms are classified into: (i) classical contracting (spot markets), (ii) neoclassical contracting, (iii) bilateral relational contract, and (iv) unified relational contracts (vertically integrated). Further development of the TCE literature has expanded the transaction organizational forms into five, with their specific counterparts in industrial organization. Peterson and Wysocki (1997) present a succinct arrangement of these five strategic options for transaction coordination, and their respective primary coordinating mechanisms, varying in the relative importance of the market mechanism ('Invisible Hand') and internal ('hierarchical') control (see Figure 1). These forms are as follow: (i) Spot market, (ii) Specification contracts, (iii) Strategic alliance, (iv) Formal cooperation, and (v) Vertical integration.

Figure 1: Alternative options for transaction organization.



Source: Peterson and Wysocki, 1997

Of relevance to the literature of contract farming are the three 'hybrid' vertical coordination forms between spot markets and full vertical integration. In the classification of transaction organization by Williamson (1979) above, the Specification Contract and the Strategic Alliance fall under the category of "neoclassical contracting", while the Formal Cooperation falls under the category of a "bilateral relational contract". A further description and discussion of these organizational forms are provided in greater detail in the next section of the paper.

The TCE approach to explaining contracts, however, is not without criticism from other schools of thought (Rehber 2000). In particular, the assumptions of the TCE framework have been criticized because of its 'overemphasis' on transaction costs, and since transaction costs are not tangible, they could not lend themselves to direct measurement for verification. (Baumann, 2000; Da Silva, 2005). Hobbs and Young (2001) provide a comprehensive documentation of these alternative viewpoints that include competency/capabilities theory, strategic management theory, and convention theory. The crucial assumption of opportunistic behaviour is also challenged by the existence of enduring social relations that are based on trust developed through repetitive transactions. TCE appears to ignore the impact of trust and the "evolution of human behaviour in a recurrent contracting situation in the manner that is taken up by "social exchange theory".¹ In developing countries where formal institutions are typically weakly developed, social capital, which constitutes the integral factors of "trust, satisfaction and power dependence" (Nahapiet and Ghoshal, 1998 cited by Huong, 2007) is particularly important. These factors are deemed crucial in developing long-term relationships among actors in the supply chain. As Ring and van den Ven (1992) note, the element of trust and informal, socially embedded relationships "can produce stable contract conditions between independent parties" and can actually decrease transaction costs particularly in relation to information asymmetry and monitoring and enforcement of contracts. Social capital deters opportunistic behaviour (Nahapiet and Ghoshal, 1998 cited by Huong, 2007).

Notwithstanding the criticisms, the TCE remains to be the dominant approach used in the literature in investigating the contract farming phenomenon.

¹ For more detailed citation of the authors that questioned the validity of the TCE assumptions on this issue, see Sartorius and Kirsten (2007).

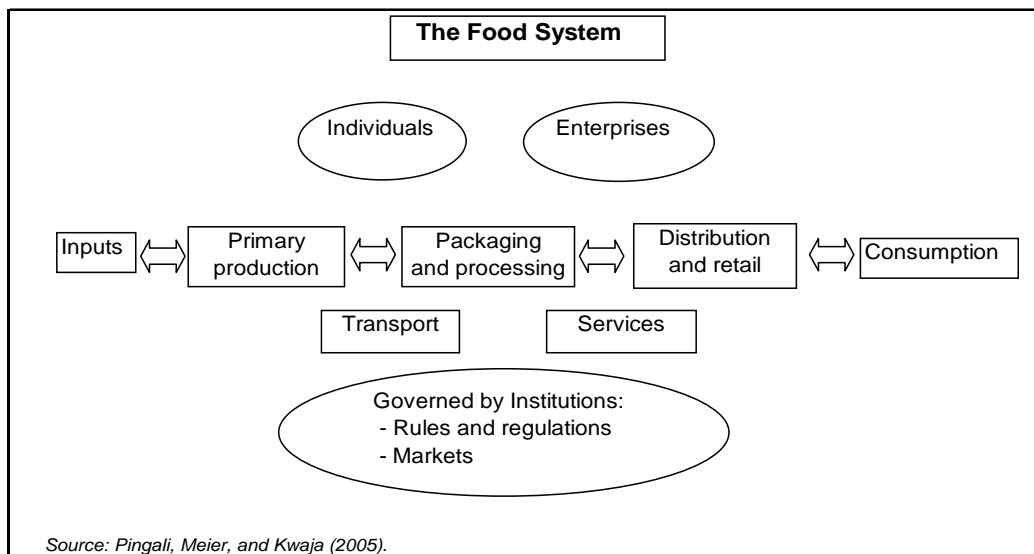
2. GENERAL APPLICATIONS OF CONTRACTS IN AGRICULTURAL COMMODITIES

2.1 The Commercialization of Agriculture in Developing Countries

The literature on contract farming is set within the backdrop of the structural transformation in agricultural development and trade. The structural changes taking place in the agricultural and livestock sector are global in scope, and are having impacts on agricultural production, consumption patterns, and processing-distribution of products in developing countries. Agricultural and food markets have, in the past 20 years, dramatically changed to become more integrated, globalized, and consumer driven. In Asia and Latin America, these changes are leading to rapid commercialization of agriculture (IFPRI, 2005).

Within the context of a commercializing and globalizing food system, there is now a much higher degree of integration between producers and the output market where product standards related to quality and food safety are given relatively greater importance. Pingali, et al. (2005) argue that agricultural production processes, except for purely subsistence farming systems, are now increasingly linked via supply chains, to markets for inputs, to enterprises undertaking the processing of output, to those distributing the final products, and to consumers demanding particular attributes of farm products (see Figure 2). Moreover, the intensified commercialization of agriculture is transforming traditional food systems. From the simple, “essentially production systems” that employed crude methods for food processing and involved minimal distribution channels, the food systems of today have become so modern and complex and even quite discriminatory with respect to putting up participation barriers against potential entrants. The emergence of modern agricultural food systems has brought forth more complex relationships and links within the supply chain and these relationships also occur under particular market infrastructural and institutional environments. Thus, larger amounts of costly information and knowledge (e.g., technological, managerial, monitoring, etc.) have to be disseminated and processed within and between each link of the supply chain to minimize informational uncertainties within the food system. Needless to say, new physical (asset) investments have to be undertaken in order to meet technological requirements associated with compliance to increasing quality and safety standards. Moreover, as the level of agricultural commercialization increases, the need for highly specialized production units mirrors the need for tighter control and supervision along the supply chain. By implication, modern food systems in the highly commercialized agricultural markets have introduced a new set of transaction costs that raised the cost of entry into certain products as well (Pingali, et al., 2005). Market failure in any one, or more, of the links also has implications on the ability of producers to transcend barriers to access to markets for inputs and/or products, and critical services (Rich and Narrod, 2005).

Figure 2: Modern Food Systems: supply chains, actors and links along the chains.



2.2 The Drivers of Agricultural Commercialization and the Emergence of Contract Farming

Demand Side Factors

Among the main drivers of the transformation taking place in agriculture in developing countries are the changing demand conditions brought about by growth in population, increases in real per capita incomes, income elasticity of demand, urbanization, and variations in real prices. Countries are also experiencing a change in tastes and preferences of their population for food products toward those considered as "superior" (Delgado, et al., 1999; Baumann, 2000; Kirsten and Sartorius, 2002; Simmons, 2002; Da Silva, 2005; Tiongco, et al., 2006; Delgado, et al., 2008; Narrod, et al., 2007).

Estimated at 6.4 billion in 2004, global population is projected to be growing at an annual average of 80 million people. The fastest growth rate of 2% p.a. is occurring in developing countries particularly in West Asia and Sub-Saharan Africa. This trend will continue until 2010 [Ashford (2004) and Rabobank (2005), cited by Da Silva, 2005]. Annual income growth rates are the highest in Africa at 4.2%, Asia at 3.5% and Latin America at 2.3% (Narrod, et al., 2007). The World Bank Global Economic Prospects (2005) foresees that between 2006 and 2015, per capita GDP of developing countries would be growing at a rate of 4.4% per year. On the speed of urbanization, the FAO (2005) projects that in the next 25 years, almost all of the world's population growth will largely be found in urban areas of developing countries.

Thus, rising global incomes, fast growing population and increasing rates of urbanization will have combined and reinforcing positive effects on the demand for food which, in turn, is projected by the FAO to reach the 3,000 kcal/person/day mark by 2015.

Diets are also changing and in particular, consumption of high value animal protein sources will likely grow at 8% per year in the next 5 years (Da Silva, 2005 citing

Rabobank, 2005)². Along with changes in the composition of the food consumption basket (diets) is the increasing demand for higher-value products over staples, product quality, food safety, and convenience. With a greater number of women in the labor force, demand for processed products and pre-prepared foods is also higher (Pingali et al., 2005). Apart from increased demand for food due to high incomes and population, consumers have also become increasingly discriminating (Kirsten and Sartorius, 2002; Delgado et al., 2003; Paulson and Babcock, 2007; Costales et al., 2007). Public awareness on eating the right foods, health risks of consuming unsafe food, and environmental and animal welfare implications of production processes is growing (Buzby, 2003; Orden, et al., 2004; Fuglie et al., 2004 cited in Tiongco, et al., 2007; Da Silva, 2005). Furthermore, there is evidence of increasing disposition of consumers toward eating meals outside the home. Consumers are willing to pay a 'price premium' for quality, freshness and safety in food products. Expectedly, these food safety issues impact more on fresh, perishable food products such as fruits and vegetables, fresh meat and seafood. These are major export products of a number of developing countries. Corollary to this, consumers now demand information on labels of food products.

Given the foregoing structural changes, agri-food systems, therefore, needed to adapt to changing consumer preferences, inducing them to have tighter control and coordination over production and handling processes such as cold storage refrigeration, and transport to ensure the steady and timely supply of food safe products. Thus, we witness the 'industrialization' or the birth of 'new agriculture' (Kirsten and Sartorius, 2002; Da Silva, 2005) where traditionally small and family-based farms are replaced by commercial or intensive factory farming. Agri-food systems are also transformed into vertically coordinated modes of governance along the supply chain, involving producers, integrators/processors, wholesalers and retailers, and even supermarkets.

Supply Side Factors

On the supply side, technological changes toward more efficient farm production and food processing, particularly in high-value added market sectors have evolved in response to rising competition for market shares. Economies of scale are exploited where they apply (Narro, et al., 2007; Costales, et al., 2008, in press) and likewise allow tighter control over product quality and other transaction characteristics. There are also significant changes that have occurred in the organization of production, procurement of supplies, and distribution of products. Efficiency gains from advances in information and communication technologies (ICT) govern supply chain management in agri-food systems today and have triggered the dominance of large retailers in the food distribution business. ICT, among other things, allows easier access to information and methods for compliance with food safety and quality regulations, through features that enable product tracking and tracing. With stringent traceability regulations already in place, responding to these regulations clearly favors the development of tightly aligned supply chains. This cuts on uncertainty and complexity of transactions as a result of asset-specific investments that include "identity-preserved supply chains" that are limited to certain parties. (Da Silva, 2005; Hobbs and Young, 2001).

Both changes in demand and supply conditions are set within a globalizing trading environment, where industrial and developing country markets are becoming more closely integrated. In particular, these developments have enormously transformed

²About 36 percent of the large net meat consumption in developing countries from 1990-2005 is attributable to poultry meat. The share of world's poultry meat consumed in developing countries increased from 43 to 54 percent for the same period (Narro, et al., 2007).

and reshaped agri-food systems, giving rise to the need for closer coordination of production, processing and distribution activities (Kirsten and Sartorius, 2002; Da Silva, 2005). But alongside the windows of opportunity for developing countries to expand markets for non-traditional exports and higher valued products, globalization likewise has opened doors for more stiff competition and stringent international standards. Regulatory standards pressure developing countries to discover ways and means to improve technical efficiency, ensure product quality, and reduce production costs to be able to keep themselves in the market loop.

On the distribution side, the move toward more industrialized agricultural production systems is also associated with the phenomenal growth of modern supermarkets in developing countries in the last decade (Reardon and Timmer, 2005)³. The emergence of these large "one-stop shops" or convenience stores in developing countries, in varying degrees of reach and diffusion via domestic and foreign direct investments, has created innovative and efficient forms of procurement of agricultural products. These innovations are also facilitated by the advancements in information technology to more quickly respond to consumer demand and preferences in domestic urban markets, if not global markets as well. The modernization of supply chains and their linkages to major urban and export markets induces new relationships between processing enterprises and individual farmers. For greater competitiveness, each function along the supply chain must be linked by better-organized services in technology use in production, transport and marketing of products.

Apart from improving efficiency in product transformation, a key to greater competitiveness is the reduction of transaction costs at each stage (Kirsten and Sartorius, 2002; Pingali, et al., 2005) This creates a need for control of the processing firm over production processes and inputs along the supply chain. This would consequently entail a new set of rules and regulations for governance by institutions as well as markets. In less developed countries, however, it is generally the case that the marketing and institutional infrastructures and services that link various parts of the supply chain for agricultural products are not that smoothly functioning. These impose barriers on the flow of trade from farm production, particularly in more remote rural areas, to the major points of demand. The existence of market failures or public goods provision between any two exchange points along the supply chain in less developed countries raises transaction costs, creating barriers to market exchange (Minot, 1986; Key and Runsten, 1999; Rich and Narrod, 2005).

The literature on contract farming in agriculture is replete with applications of transaction cost analysis on the exchange along a particular link, or a series of links along the agricultural supply chains. As agri-food chains become modernized, all actors in each stage or link of the supply chain face transaction costs (Pingali, et al., 2005). In particular, the transaction costs of an agribusiness processor consist of the bureaucratic costs of maintaining a purchasing office; the search cost for suppliers; the screening costs arising from information asymmetries with regard to uncertainties of product quality and reliability of potential sellers; storage and transport costs of goods; the cost of contract enforcement and monitoring; and management and coordination costs related to integrated production, processing and marketing (Sartorius and Kirsten 2007; Pingali, et al., 2005).

On the other hand, farmers also incur transaction costs related largely to their participation as they try to integrate into the modern food systems. These costs

³ Reardon and Timmer (2005) indicate that the first wave covered much of Latin America and East Asia (except China), North-Central Europe and South Africa. Entering the 1990s, these supermarkets accounted for only 5-10% of agri-food retail sales. By 2000, the influx of modern supermarkets had led to these entities capturing 50-60% of the agri-food retail market. The second wave of supermarket diffusion took place in the mid-1990s, covering parts of Central America and Mexico, Southeast Asia, and South-Central Europe, with the share of supermarkets in total food retail reaching about 30-50% by the early 2000s. The third wave of diffusion started only in the late 1990s, affecting the big countries of China, India and Russia, and some countries in Central and South America, in Southeast Asia, and some in Africa. By the mid-2000s, supermarket share of food retail had already reached 10-20%.

would include asset specificity associated with physical (land characteristic that may limit scale and type of product to be produced, capital equipment, other physical investment), spatial (location of farm that has bearing on communication and road infrastructure which, in turn, affects their access to production inputs and markets as well as to the potential of being reached and chosen by agribusiness processors or integrators), time and crop/product (may be related to perishability of product) and human capital (skills, education, specific knowledge). Other farmer transaction costs would be access to information and credit, risk and uncertainty of finding and bargaining with a market outlet/buyer (Hobbs and Young, 2001).

Applications in agricultural supply chains in developing countries are found in transactions dealing with high-value products such as fruits, vegetables and livestock products, destined either for export markets or supermarkets in highly urbanized centres. The general product characteristic of perishability generates the transaction characteristic of uncertainty (Hobbs and Young, 2001; Delgado et al., 1999). A problem in uncertainty of product quality and reliability of regular supply confronts the buyer. On the other hand, the seller is faced with the problem of uncertainty of finding a buyer. Thus, perishable products must be moved quickly and transacted frequently.

When product quality becomes an important issue in market exchange, a buyer is confronted with uncertainty over the product quality particularly when quality is not readily visible in the form of the transacted product, and known only when the product is subsequently subjected to processing or is consumed. On the other hand, the seller is confronted with uncertainty over the price received for supplying a higher-than-normal quality of product. When the spot market fails to recognize product differences, and fails to award proper price premia to higher-quality products, economic agents would look for other governance mechanisms that more efficiently solve the problems posed by uncertainty.

The production and marketing of differentiated products, catering to particular preferences of higher-income urban consumers or export markets also induce the undertaking of asset-specific investments focused on the production and supply of these products. Committing such investments, however, subjects the particular economic agent to risks of hold up by the possible opportunistic behaviour of trading partners in a market transaction. Mitigating against such risks in the open market raises the transaction costs and induces a search for alternative governance mechanisms by an agricultural enterprise.

Kirsten and Sartorius (2002) argue that efficient transactions using spot markets are usually applicable when the conditions approach that of perfectly competitive markets (i.e., many buyers and sellers dealing with homogeneous goods, perfect information, unrestricted mobility of inputs and outputs). On the other hand, spot markets function with great difficulty, and thus 'fail', in communicating production and marketing information when dealing with products that exhibit variation in consumers' demand for quality and timing of such demand, and in overcoming problems arising from the non-functioning of, or imperfections in the inputs market (credit, high quality inputs, specialized skills, production services) that are a common occurrence in less developed countries. Many problems of market failure and missing markets often arise due to asymmetric information and an array of product and transaction characteristics that raise transaction costs (Minot, 1986; Key and Runsten, 1999; Hobbs and Young, 2001). Thus, as various consumer demands become more specific, products require greater differentiation. To respond to these requirements, specific investments in production technology must be undertaken, and supply systems must be devised to keep intact product characteristics from production to final distribution. To remain competitive in such a dynamic agricultural market environment, firms must find alternative governance structures to exercise greater control in the production, processing and distribution functions. Firms accomplish this by either fully vertically integrating, or by engaging in contracts with farmers,

engaging in strategic alliances (partnerships), or engaging in a merger with the enterprise with which it had previously been engaging in a market transaction.

In setting the context in which contract farming is situated, interest is focused on the three governance modes between the extremes of spot markets and full vertical integration, as illustrated previously in Figure 1. The three modes are ordered according to increasing role of internal control (diminishing role of market-based incentives). A general description of each is given below to emphasize distinctions.

- a. Specification Contract - a short-term agreement between two parties for one to produce and the other to purchase a specified quantity of a product, of particular quality, and delivered at a particular time. The contract may be formal or informal, written or unwritten, and the contract could be renewed and transactions become recurrent. Each of the transacting parties retains its own identity and autonomy in performing its own part of the contract.
- b. Strategic Alliance - a longer-term agreement between supplier and buyer to work closely in producing and marketing a particular product of higher value to generate higher joint profits. This agreement may be embarked on due to the potential synergy benefits in the use of core competencies. Each party also retains its own identity.
- c. Formal Bilateral Cooperation - a long-term contract where two parties pool own equity and resources to enter into a joint project in producing and marketing a distinct final product of higher market value, with strong internal control within each entity in the venture. Internal control takes precedence over the identities of the two parties to the agreement.

In the simplified description of the three categories of transaction organization, two areas of differences stand out, and these pertain to the duration of the relationship, and to the degree of autonomy that each party to the agreement retains. When one attempts to match the various schemes of contract farming in developing countries with the three categories of governance above, there is no automatic correspondence as to which general category each contract farming scheme would fall.

Sartorius and Kirsten (2007) expanded on the basic framework of Peterson and Wysocki (1997) on the choice of transaction organization and extended it for application in agricultural food systems to explain the choice by an agribusiness processor of a governance mode. Using the basic transaction characteristics of frequency, asset specificity, and uncertainty in the TCE framework, and then expanding on the various elements of uncertainty, the corresponding transaction organizational forms are identified. Focusing on the three 'hybrid' forms of vertical coordination between the extremes of spot markets and full vertical integration, the organizational forms are identified according to certain measures of the intensity of various transaction characteristics considered. Of the three hybrid forms, the first two are categorized as 'Neoclassical Contracts' (as distinguished from Classical contracts in spot markets) and one is categorized as a Bilateral Relational Contract. The truncated adaptation of the framework of Sartorius and Kirsten (2007) is given in Table 1, which builds on the initial framework they developed in 2005. The transaction characteristic of uncertainty is broken down to eight elements, which take into account the characteristic of the transaction itself, the ability to control elements of the contract, as well as uncertainties that agro-ecological factors could impact on the ability to deliver when engaged in an agricultural production activity.

Implied, but not shown in Table 1 is that infrequent transactions and those with a low or moderate level of uncertainty and asset specificity will be best coordinated by the open market. On the other extreme, transactions that are frequent, and with very high levels of asset specificity and uncertainty are best coordinated by full vertical integration. Applying the framework developed in Table 1 helps us in understanding

the nuances of and links between the emergence of tighter and closer coordination in modern agri-food systems, and the emergence of contract farming in particular.

Table 1: Transaction cost framework for agricultural value chain governance structures between spot markets and full vertical integration.

Contract / Transaction Characteristics	Governance for Vertical Coordination		
	Neo-classical contracting		Bilateral relational contracting
	Specification Contract	Strategic Alliance	Formal Bilateral Cooperation
1. Frequency	Low-medium	Medium	High
2. Asset specificity	Low-medium	Medium	High
3. Uncertainty			
Ability to walk away / Switching cost	Yes / lower	Less / less	Low / higher
Availability of Substitutes	Yes / less	Less	No
Duration	Short / medium	Medium	Long
Ex ante control (contract conditions and costs specified up front)	Medium	Low	No
Ex post importance (managing other conditions as they come)	Low / medium	Medium	High
Information shared	Low / medium	Medium	High
Contract enforcement	Legal-complex	Complex	Bilateral
Agro-ecological risk	Low-medium	Medium	Medium-high

Source: Adapted from Sartorius and Kirsten (2007)

Sartorius and Kirsten (2007), however, caution that the choice of the mode of transaction governance according to transaction characteristics within the TCE framework, as depicted in Table 1, should not be taken deterministically, where a combination of transaction characteristics yields only a single efficient governance mode. This is in recognition of the criticisms on some of the weaknesses of TCE along the lines of ignoring substantial insights from social exchange theory, which includes the important role of trust and the significance of the evolution of human behaviour in recurrent transaction situations. Even in risk situations, the element of trust between transacting parties modifies the effect of given transaction characteristics on the governance choice. The higher the trust level, the greater the suitability of more decentralized governance structures (e.g., towards more decentralized neoclassical contracts). Conversely, the lower the trust level between parties to the transaction, the stronger the tendency towards more hierarchical or relational contracts.

Using Table 1 as a starting point in locating the various contract farming schemes in the literature along the spectrum of transaction organization for vertical coordination, most of the production or/and marketing contracts in developing countries appear to fall under the general category of 'Neoclassical contracts' rather than under 'Bilateral relational contracts', for the reason that contract farmers generally retain their own identity as partners to the agreement. Too, individual farmers are not generally accorded an "equal footing" status by their respective integrator companies to merit being a partner in a bilateral relational contract.

The literature on contract farming, indeed, reveals that the degree of autonomy granted to contract farmers depends on the nature of production or marketing coordination problems that need to be addressed and the specific terms of the contract. The classification that Minot (1986) provides on three types of contracts addressing particular categories of market failure is quite instructive. These are described below:

- a. Market specification contract - addresses failures arising from **marketing information asymmetry** with respect to location of particular markets, quality required, timing (seasonality) of demand, and movement in prices offered. The contract allows greater exchange of information on the above items, with both the farmer and the buyer (or intermediary) benefiting from price premium on quality and the stability in the flow of supply of products to specified markets.
- b. Management-providing contract - addresses failures arising from **production information asymmetry** with respect to technology that could improve farm profitability by raising product quality and control of timing of supply. The contract allows the buyer (intermediary) with the information to specify and assist the farmer in the execution of least-cost production practices to attain higher quality and control timing of output. The buyer recoups the costs of extension from the proceeds of marketing a higher-quality product according to the timing of demand.
- c. Resource-providing contract - addresses failures arising from **imperfections or incompleteness in the markets** for credit, inputs and/or agricultural services. The contract allows the buyer to supply the proper inputs on credit and corresponding technical assistance. The buyer is assured repayment by the contract to market the product.

Comparing the characteristics of each of the types of contracts addressing various types of market failures and the general categories of contracts according to transaction characteristics in Table 1, the first scheme - Market specification contract - fits quite close to a Specification contract, with low-to-medium intensities in terms of frequency of transaction, asset specificity and uncertainty of outcomes. The main engagement of the buyer or intermediary is in the communication of valuable market information that allows both of the contracting parties to profit from the supply of a higher-value product.

On the other hand, a Management-providing contract appears to fit closer to a Strategic alliance. The exchange of production-related information is more intense, and the market intermediary gets more deeply involved in the production process at the farm level through the extension of technical services to have greater control in ensuring that the product quality desired by the market is achieved, and timing of supply is scheduled according to the behaviour of demand. To obtain the desired final product, both parties must undertake risk in asset-specific investments in production and processing, and both activities must be synchronized.

The third contract type - a Resource-providing contract - although involving the highest degree on market intermediary control of the production process at the farm level, having proprietary rights over inputs, technology, and output, does not quite fit into the category of a Formal bilateral cooperation, but the degree of hierarchical control could very well approach that of full vertical integration, depending on the degree of market power of the intermediary or integrator company. Where the bargaining power of the farmer and the intermediary-resource provider is relatively balanced, and both work to exploit their respective expertise (comparative advantage) in putting to productive use their asset-specific investments, the relationship can be transformed into a Strategic alliance.

With the framework developed above on the general categories of contracts according to transaction characteristics, and the more specific classification of contract farming schemes according to the type of market coordination failures addressed, contract farming in developing countries in the field of agriculture in general, and in livestock production in particular, could be discussed in the next sections.

2.3 Trends and Typologies of Contracts in Developing Countries

Developed Countries

The documentation of contract farming as early as the first half of the 20th Century refers mostly to the engagement in vertical coordination by agribusiness enterprises in the industrialized countries in North America and Western Europe, particularly in the production and processing of vegetables and fruits. In the early 1900s, the US banana companies in Central America also engaged in this type of vertical integration (Watts, 1994). In the 1930s and 1940s, contract farming was widely used by the vegetable canning industry in North America and the seed industry in Western Europe, respectively. By the late twentieth century, this form of governance structure became an integral part of the food and fiber industries in much of Western Europe, North America and Japan (Rehber, 1998). MacDonald, et al. (2004) cite a USDA report that showed a dramatic increase in the share of contract farming in the value of agricultural production in the US from 12% in 1969 to 36% in recent years. Agricultural crops like sugar beets, fruits and processed tomatoes are vertically coordinated through contracts.

In the US, contract farming in livestock, particularly in broiler production, caught up in the 1950s (Taylor, 2002). Today, the poultry industry in the US is almost fully vertically integrated (Roth, et al., 2001). Vertical integration in the US hog industry seemed to have become widespread much later, in the 1980s. The proportion of pigs produced under contracts increased from 2% in 1980 to 18% in 1990 (Rehber, 1998). Between 1992 and 1998, the share of hog output produced under contracts rose from 22% to 63% (Key and McBride, 2003; Hobbs and Young, 2001).

In the EU, contract arrangements had been encouraged by the production systems that evolved under the EU Common Agricultural Policy, where the volume of output and quality of products are tightly controlled, particularly in highly perishable products such as dairy and poultry, fruits and vegetables, and even in sugar beets.

In Asia, the earlier adopters of vertical coordination in poultry were South Korea and Japan. In these developed countries, broiler integration is 23% and 75%, respectively in 1989 (Yi, et al., 1993 cited by Rehber, 1998). Miyata, et al. (2007) provide empirical evidence of contract farming with small-scale apple and green onion farmers in China.

Simmons (2002) cites Runsten (1992) and Goodman and Watts (1997) for documentation of contracts in the early 1990s for high value crops that include strawberries, melons, bananas, pineapples and frozen vegetables processed in Mexico and Central American countries and exported to the United States and Europe by local and multi-national agribusiness firms. Simmons (2002) cites Jaffee's (1994) view that the emergence of contract farming over the last quarter of the 20th century could be attributed to the phenomenon of increasing trade liberalization where the removal of trade restrictions created a window for the influx of agricultural exports especially high value foods from developing to developed countries. For instance, increased trade inflows of fruits, spices and vegetables from Mexico, Latin and Central American countries into the U.S. and Europe occurred in the 1990s. In particular, exports share of traditional crops such as cereals, cocoa, coffee and sugar declined while those of non-traditional products like Kenyan off-seasonal vegetables, Brazilian citrus, "Chinese shrimp" from Argentina, and dairy products increased. Similar trade incidences were also evidenced from Africa (Runsten, 1992; Goodman and Watts, 1997; Glover and Kusterer, 1990; Porter and Phillips-Howard, 1997; as cited by Simmons (2002).

Spread in Developing Countries

In the less developed countries in Latin America, Asia, and Africa, the exact origins of contract farming are difficult to trace. Earlier practices of vertical coordination appeared to have been related to the operations of multinational agribusiness companies or state-owned enterprises in the plantation sector producing commodities destined for export markets such as banana, tea, tobacco, sugar, oil palm, and rubber. These schemes were common in Asian countries like Malaysia and Indonesia; in the African territories of Kenya, Zambia and Zimbabwe; and in Latin American countries such as Peru and Honduras.

In the midst of the macro-economic structural adjustments programmes that quite a number of developing countries underwent in the second half of the last Century, many state-owned enterprises collapsed (Rehber, 1998). The changing conditions in the global market for commodities also induced a restructuring of the organization of agribusiness in plantation crops. From the operation of large single plantations, a shift had been observed in favour of production through contracts that reduced the risks to investments in large tracts of land by large agribusiness enterprises.

Empirical evidences of movements away from plantation production to contracts with individual producers are seen in developing countries. For example, in Zimbabwe, contract farming is encouraged in the sugarcane, tea and cotton industries. Multinational corporations in Central America have shifted away from plantation production of bananas to contract farming. For many other countries, tobacco estates have been replaced by smallholder production. A multinational corporation in Northern India engaged 400 contract farmers to grow hybrid tomatoes for processing into paste. Export trade of gherkins by companies in Sri Lanka has been made possible by contracting about 15,000 small-scale growers. Thailand entered into contracts with 200,000 farmers to grow sugarcane under a government sponsored program (Seidler, 2002).

The more recent spread of contract farming in developing countries appears to have followed also the path that Reardon (2006) describes as the three 'waves' of diffusion of supermarkets by multinational agri-food companies in Latin America, Asia, and Africa, with the fourth wave said to be slowly starting in South Asia. This link is not far-fetched as the diffusion of supermarkets also brought about the spread of new procurement strategies by these enterprises to secure the supply of a consistent volume of high quality agricultural products destined for domestic urban centres and even for export markets.

In the literature, there are certain types of farm products that are more amenable to vertical coordination, such as contract farming, than others. There is no one-to-one correspondence, however, as the production and marketing of these products should be taken in the context of the given market and institutional environment in developing countries. These products either have one or more of the following characteristics: high perishability, high quality specificity, high labour intensity, and high value-to-weight ratio (Hobbs and Young, 2001; Delgado, et al., 2008). Generally, these products include those destined for export markets and products that require traceability and/or food safety certification even if they are destined for the domestic markets.

Contract Farming in Country Case Studies

This section will discuss empirical examples of contract arrangements and trends in the production and marketing of poultry, milk and pigs in selected case countries like the Philippines, India, Thailand, and Vietnam.

Poultry

In industrial-type broilers, in all countries, formal contracts dominate over informal contracts between integrators and farmers, which are mostly medium- to large-sized farms (>1,000 birds per cycle per farm). Strict rules govern volume of inputs provided by the integrator and volume of output turned out by the farmer, with also provisions on some quality specifications on individual bird output. Integrators have proprietary rights over the technology, inputs, and output.

In the Philippines, six large integrators who have formally organized themselves control about 80 percent of the broiler market. They engage in breeding and contract growing, processing, and distribution of branded output. Through a “gentlemen’s agreement”, they set the daily reference price. The integrators are also the main source of day-old chicks for independent commercial producers and smallholders. They supply their own feeds for internal use and also compete with small-scale feedmiller in the brands of mixed feeds (Costales, et al., 2003).

The market for dressed broilers is also controlled by the large integrators. Market outlets are retail meat shops and supermarkets that are vertically coordinated. In an environment of market uncertainties created by international trade in meat, independent producers face higher income risks from larger fluctuations in live broiler prices relative to dressed meat prices (Delgado et al., 2008).

In Thailand, the broiler market is dominated by a dozen integrators, who have complete control over the entire supply chain, from grandparent stock farms to the food retail business and export trade. Major structural changes occurred in the 1970s when the Charoen Pokphand Company (CP) established its chicken breeding business through a joint venture with the US-based Arbor Acres Company, bringing improved grandparent stock into Thailand. By mid 1990s, CP has become a diversified and vertically and horizontally integrated multinational corporation. The Thai broiler chicken experienced tremendous growth with the extension of the CP model to the poultry producers. Broiler production more than doubled from 474,000 tons in 1983 to over 1.2 million tons in 2001 (Poapongsakorn, et al., 2003). This was brought about by access to the export markets “through unit cost-cutting technology and organization put in place by the private sector, and through supportive regulation and trade liberalization by the State” (Delgado et al., 2008).

India is now the world’s eighteenth largest producer of broilers (Mehta, et al., 2003). Poultry production is growing at a relatively fast annual rate of 10 percent. The industry remarkably transformed from a backyard activity into a major commercial activity in four decades, stimulated by the importation in 1974 of grandparent stock from Cobb, a dominant multinational firm at the time. Cobb and Venkateshwara Hatcheries set up a joint venture in the 1980’s to produce pure-line parent stock. Venkateshwara now exports breeding stock to Nepal, Bangladesh, and Bhutan. Huge private sector investments were made in breeding, hatching, rearing and processing. Indian farmers have switched from growing traditional breeds to producing internationally recognized hybrids. Virtually all Indian poultry production is consumed in India and South Asia. The growth of the poultry sector in India is marked by scaling up of poultry farm sizes from only 200-500 chicks per cycle in the early years to 5,000 to 50,000 birds per cycle, which is now the typical farm holding (Delgado et al., 2008). Contract farming is observed in a few cases where industrial processors require quality control of inputs for specialized industrial outputs (Mehta, et al., 2003).

Dairy

In milk production, both formal and informal contracts exist. In Thailand and Vietnam, where the dominant final product is ultra-high temperature (UHT) processed milk for urban consumers, processors engage in strictly defined formal contracts with farmers, with scale of production depending on the predominance of small, medium or large producers in the area of coverage. In India, outside the contracts within cooperatives, the emerging contracts involve processing companies who engage in formal contracts with an intermediary (collector) in the supply of fresh milk, while the intermediary engages in informal contracts with farmers, mostly smallholders.

The dairy sector development in Thailand is basically public sector driven unlike in the broiler and hog industries case. The goal of the government is to develop small- and medium-scale production and this it did by direct importation of dairy breeding stock, provision of production subsidies, tariff and quota protection, and coordination between dairy producer cooperatives and dairy processing companies. Through these public support measures, farmer cooperatives have been able to sell all their raw milk at prices much higher than world markets' (Delgado et al., 2008). Thailand dairy followed the 'formal' and 'commercial' market route, through large processing companies, contracting with formal Cooperatives.

Further government support was extended between 1993-1995 via a project that gave free milk to elementary school children 260 days a year. To spur demand for locally produced milk and improve nutrition at the same time, subsidized milk for students had to come from domestic production only. Indeed, domestic milk consumption rose to 9 kg per capita in 2001, compared to only 1 kg in the early 1980s (Delgado, et al., 2008).

India is the world's largest milk producer. It is now producing over 90 million tons, more than four times the level in the 1950s and 1960s. It is also engaged in milk exports. This significant change was brought about by protectionist government policies that improved technology in dairy production and promoted dairy cooperatives by shielding them from internal and external competition until the sector was liberalized in 1991 (BIRTHAL, et al., 2006).

Dairy production in India is overwhelmingly carried out by small-scale producers throughout the country, hence, contracting with them individually would be very costly for the processor. To circumvent around this problem, an "agent" acts as an intermediary between the processor and the producers. Informal contracts assured smallholders of a market for their milk products. Processors also extended assistance to producers by providing inputs, technical advice and extension services at prices lower than the market price. Moreover, processors also shared management skills and techniques, *pro bono*. To ensure good quality and reliable supply of milk, processors would monitor contract farmers' performance and prevent conflicts between growers and the agent. Production and price risks, however, are borne by producers alone (BIRTHAL et al., 2006).

Dairy in India, with a different consumption and tradition history, followed the 'informal' markets route, dominated by smallholder producers, supplying small local processors, serving local consumers with particular preferences for fresh milk and traditional processed milk products. The formal cooperatives and large dairy processing companies that supply supermarkets constitute less than 20% of India's dairy market.

Dairy evolution in Vietnam, on the other hand, is unique in that it immediately followed the 'formal' and 'commercial' (industrial) path of ultra high temperature (UHT) milk. Thus, farmers' products must conform to processing company standards dominated by the State-Joint Venture of VINAMILK, with some competition from a local-foreign company joint venture (Dutch Lady).

Pigs

In the Philippines, the hog sector is less concentrated than the broiler industry. Hog producers, regardless of scale of operation, have relatively competitive access to the major markets for live slaughter hogs. Although no one integrator has a dominant market share unlike that in the chicken industry, trends show, however, that in the major hog producing provinces surrounding Metro- Manila, large-scale farms have overtaken backyard farms in output share (Costales, et al., 2003).

Vertical integration and contract growing have not yet become widely adopted throughout the hog industry. Only about 5% of the market output is contracted out (Costales, et al., 2003). A few larger-scale commercial firms in the hog sector are vertically integrated from breeding and contract production, to slaughter and processing of branded meat products. These large firms are able to meet the food safety certification requirements and quality standards set by their major market outlets-- supermarkets, up-scale restaurants and hotels (Delgado, et al., 2008).

There is the unique case of the Sorosoro Ibaba Development Cooperative (SIDC) that formally contracts out with smallholder pig producers and has ensured continued participation of these smallholders by assuring a market for their produce because of the trust and reputation of producing good quality pork that SIDC has built over time (Costales, et al., 2007).

Major changes in the Thai swine industry began to take place as early as the 1980s. Like the broiler industry, these changes have largely been private-sector driven. Improvement in animal genetics through importation of exotic pig breeds and the introduction of evaporation shed cooling have paved the way for industrial swine production in Thailand. Between 1988 and 1998, the share of Thai swine farms with holdings of more than 100 sows almost tripled from 3.5 percent to 9.3 percent while the share of small scale farms with holdings of less than 20 sows decreased from 55 percent to 32 percent (Poapongsakorn, et al., 2003). Thailand exports pork to high-value markets although export expansion could not run a steady pace due to disease problems, the restrictive regulation of slaughterhouses, and mounting environmental concerns.

In pig production, contracts exist in industrial-type hogs in Thailand, Vietnam and the Philippines. Formal contract growing, however, is not yet the norm even in Thailand which has the more advanced pig industry among the three countries. For the Philippines and Vietnam, production under formal contracts constitutes only a very minor share of the total output. Unlike in broiler chicken where the sources of day-old-chicks and formula mixed feeds are controlled by the few large integrators, there are alternative sources of commercial breeding and fattening stock in pig raising, and there are alternative sources of feeds or feed ingredients.

In all countries, formal contracts involve medium- to large-scale farms (>100 heads per cycle per farm). In the Philippines, however, there are a few smaller-sized feedmilling enterprises engaging in formal contracts with smallholders (20-80 heads of pigs per cycle per farm) (Costales, et al., 2007). In Vietnam, informal contracts exist in the production of industrial-type pigs with cooperatives and with input and/or output traders (Son, et al., 2007). For indigenous pigs, informal contracts exist between pig producers and output traders. While members of pig raising cooperatives mostly involve medium- to large-scale producers, those engaged in informal contracts with traders tend to be mainly smallholders (Huong, 2007).

In the case of Vietnam, not much literature can be found that document contract farming particularly in livestock. The few ones that exist are quite recent, mostly done only in the last five years. This is probably because contract farming is a relatively new development particularly in the pig sector. (Son, et al., 2007). Huong (2007) citing Moustier et al. (2003) and (IAE 2005) reveals that establishing contracts between pig producers and traders is difficult in Vietnam because of fluctuating

prices, the absence or lack of legal framework, and diversity in production activities of these economic agents. As such, only about 2% of households engage in formal pig contract growing. Lapar, et al. (2003) noted that pig trading in Vietnam is basically 'ad hoc' and usually done on individual capacity. As the linkage between producers and market agents are weak, traders attempt to establish relationships with pig raisers and collectors (Hoa, 2007 cited by Huong, 2007).

Informal or verbal contracts rather than formal contracts are the norm in almost all regions in Vietnam. These are contracts where producers are not held liable nor will they be penalized if they fail to keep the contract. Contracts are largely based on social capital that includes 'trust, satisfaction, and promise keeping'. Over repeated buying and selling negotiations, traders and buyers would have developed some kind of relationship such that traders can already predict when their previous producers will have pigs to sell and be assured that the pigs will be sold to them (Nahapiet and Goshal, 1998 in Huong, 2007).

Thus, there are divergences in the nature of the contracts in the case countries. These varied depending on the length of history and level of development and maturity of formal contract relations in the countries as influenced by the strength of the legal and institutional framework to enforce contracts. They also varied according to the nature of the product in terms of the appropriation of the benefits to the employed technology by the integrator, the target markets for the output, as well as the dominant scale of production of the commodity in each country or location within a country.

The existence and persistence of informal contracts between traders and farmers, in the absence of a well-functioning legal and institutional framework to enforce contracts, are based mainly on social capital and trust, where repeated satisfactory transactions reduce uncertainty and build reputation, thereby also effectively reducing transaction costs.

3. ASSESSMENT OF THE EFFICIENCY AND EFFECTIVENESS OF CONTRACT FARMING AS MARKET LINKING INSTITUTIONS FOR SMALLHOLDER LIVESTOCK PRODUCERS

3.1 Nature of Contracts

In the investigation on the nature of contracts, their terms and conditions, the literature mainly deals with formal contracts. Adaptations of such modern formal contract agreements from industrialized countries are seen in the case countries of India, Thailand, Vietnam and the Philippines albeit these are modified according to the institutional environment in the developing countries concerned. The nature of livestock production contracts engaged in by the integrator and the farmer differs according to the product in question in the transaction. Yet even for the same product, there are variations across countries that tend to be driven by the changing needs of the markets on certain product attributes, types of transaction costs that need to be hurdled, and the distribution of power between integrator and farmer (Delgado et al., 2008). The more recent inclusion in the source of contract agreement variation is the risk on accountability for environmental pollution.

Formal broiler contracts are the most widespread and advanced in the case countries, mainly modelled from contracts with broiler industry multinationals in developed countries such as the United States. An example of modern legal contracts as in the U.S. is described by Hamilton (2001). The integrator (company or contractor) owns the day-old-chicks and delivers them to the grower (producer or contractee) for caretaking until such a time --generally seven weeks-- that the integrator decides to collect them for processing. The integrator also agrees to provide other inputs such as feeds, medicines and technical supervision during the grow out operation. On the other hand, the contract grower agrees to provide the land and housing facilities, the utilities, labor and management services. Most contracts are for one growing period only and the integrator reserves the right for continuation or cancellation. The grower is given compensation based on his or her production efficiency using a formula that calculates for the feed-conversion ratio and harvest recovery rates. Comparative ranking with respect to other contract growers of the company within the same geographic area is made and is used to adjust grower's remuneration.

Contracts are mainly of two forms: fixed-fee or wage contracts, and forward-price or profit-sharing contracts. The main differences between these contracts are in the "mode of grower remuneration, in the accounting and shouldering of the growing stock and feeds, in the need to monitor production activities, and in the need for enforcement of actual deliveries. They also vary across incentives, penalties, risks, and the provisions for defaults" (Delgado, et al. 2008)

Fixed-Fee or Wage Contracts

Essentially, in the scheme developed by Minot (1986), such could fall under the class of resource-providing contracts, where the integrator provides all intermediate inputs required to produce the output. The standard input-output ratios and quality attributes are stipulated. The farmer is then paid an agreed upon fee in exchange for his labour, management, and use of facilities. Under fixed-fee contracts, the integrator assumes the market risks of changes in input and output prices. The producer is insulated from risk, but does not share from the gains obtained from the realization of more favourable prices.

On the other hand, production risks impact on both parties when further complexities in the contract are introduced to include provisions for incentives and penalties based

on production performance. Incentives and penalty provisions on feed conversion ratio (FCR) and harvest recovery rate (HR) also work as a deterrent to producer 'cheating' (i.e., would mean lesser supervision and monitoring costs). The possible diversion of feeds and other inputs to other activities is a risk to the integrator, but agreed standards on FCR would mitigate the risks on the part of the integrator. Mortalities of livestock are also a risk to the integrator, but standard agreements on HR mitigate (Delgado, et al. 2008).

Forward-Price or Profit-Sharing Contracts

Forward-price and profit sharing contracts appear to be a mix of a market specification and management-providing contract, where the integrator ensures the marketing of the output, but is also involved in technical assistance at the farm production level in order to come up with the product characteristics demanded by the market. The degree of integrator involvement depends on the level of skills the farmer has acquired at the production level. These contracts, however, may also contain certain features of a resource-providing contract where the integrator assures the supply of the intermediate inputs but on credit at agreed-upon prices. The cost of these inputs is then charged to the farmer when the output is sold.

A minimum forward-price of output could be guaranteed to the producer. Where this guarantee is provided, the integrator assumes the market risk. Under profit-sharing contracts, in the case where the output price used to compute profits is the prevailing market price at the time of the disposal of output, the market risks are shared between the two, and so are the benefits to an output price increase. On the input prices side, the bearing of risks would depend on the treatment of input prices used. If at prevailing market prices, the risks are shared. The production risk is either totally or partially borne by the producer, depending on the agreements pertaining to mortalities. Since HRs and FCRs may not come explicitly into the calculation, there may be specific provisions on the treatment of mortalities. For such, there are supervision costs entailed in investigating the cause of mortality. When production risks are shared, there is incentive for both parties to obtain the maximum activity profit by minimizing production losses from mortalities and activity inefficiencies (Costales, et al., 2007; Delgado et al., 2008).

3.2 Contract Farming in Country Cases

Formal Contracts

Formal contracts in broiler production are mainly of the fixed-fee type in India and the Philippines, but have shifted to guaranteed forward-price contracts in Thailand. In fact, 80 percent of broiler contracts use the forward contract. Poapongsakorn, et al. (2003) conjecture that only a few large-scale integrators who are also absentee contractors dominate the broiler market. Therefore, they will not be willing to incur higher transaction costs arising from the needed tight monitoring activities. They would obviously prefer risk-sharing with growers. *Local* large-scale contractors who are able to control the opportunistic behavior of the growers are the only ones willing to engage in the wage contract. Typically, the wage contract in the broiler sector is between the local integrator and the smallholders who are credit-dependent on the former. For the Thai case, the 'forward price guarantee' is a binding price from which the calculation of profits would be made. In the Philippines case, the output price is not pre-determined.

In pig production in Thailand, Vietnam and the Philippines, contracts with large-scale producers (>100 hogs per cycle per farm) are dominantly fixed-fee contracts. I

Contracts with smallholder pig producers in the Philippines are profit-sharing contracts where a 50-50 profit sharing is specified (Costales, et al., 2007; Poapongsakorn, et al., 2003; Birthal et al., 2006; Son, et al., 2007). In the Philippine case, the 'profit sharing' contract is more prevalent where there is close proximity between producer and integrator, where supervision and monitoring costs are not prohibitive. Moreover, familiarity between integrator (coop) and the producer (member) also breeds a greater degree of trust than in the fixed-fee relationship between a large producer and a distant large integrator (Costales, et al., 2007).

Forward-price contracts in the Philippine case are such that when mortality is due to abnormal death due to community-wide occurrence of fatal diseases, the loss is shared by both parties. It is in the interest of both parties to prevent mortalities from these sources (thus the veterinary health programme by the integrator, the cost of which is charged to the operation, i.e., shared). When the cause of death is deemed to be the result of producer negligence, the cost is borne entirely by the producer. There is also the risk of the producer diverting feeds to other activities. Since there are no incentives and penalties with respect to FCR provisions, there may be incentive for the producer to 'cheat'. Output losses from cheating would be shared by the integrator. For this reason, the supervision and monitoring costs do not disappear, but rules and penalties are imposed on the violation of agreement on diversion of feeds (Costales, et al., 2007).

In general, for formal contracts, when integrators are dealing with large- or medium-scale farmers, fixed-fee contracts are offered, and they exert quite a heavy market power relative to the producer, with as much production risk shifted to the producer. When producers have sufficient capacity to manage and control their production performance, and could undertake production independently by assuming all the market risks, guaranteed forward-price contracts emerge.

Informal Contracts

Looking at the categories of vertical coordination governance expanded by Sartorius and Kirsten (2002) according to transaction characteristics, the various forms of informal contracts could be put under the general category of specification contracting. Due to the relative flexibility of these informal contracts, they also have various degrees of transaction characteristics that tend towards spot market contracting.

In terms of the schema developed by Minot (1986), informal contracts are more difficult to put into a box. Some have the characteristics of a simple resource-providing contract in terms of the integrator assuring the supply of intermediate production inputs on credit, to be repaid when output is sold, but with no obligation on the part of the farmer to yield the output to the integrator for marketing the product. Some exhibit a combination of a management-providing and resource-providing contract where the integrator extends technical services to obtain the volume and quality of product required.

The terms of the form and conditions specified in the informal contracts as found in the production and marketing of dairy in India and pigs in Vietnam, are closer to variations of profit-sharing contracts rather than fixed-fee contracts. In the dairy case in India, the contract offers the guarantee of supply of intermediate inputs, livestock services, and market outlet for the smallholder producers, in exchange for the guarantee of supply of milk to the processor, through its intermediary (Birthal et al., 2006). In the case of pig production in Vietnam, (Son, et al., 2007; Huong, 2007) unless the agreements specify, the contracts are mainly for certainty of intermediate input provision. The livestock services are an 'add-on'. Integrators may assist in the establishment of market outlets for output, or may offer to mediate the selling

(marketing) of output (e.g., cooperatives), but producers are free to find the buyer that offers the best terms.

Interestingly, collectors play an important role and are considered integral intermediaries in the supply chain for pigs in villages far from town. They act as transaction facilitators between producers and traders. They assemble pigs pre-classified as indigenous and local and then sell them to traders and restaurants, their main clientele. In particular, producers of indigenous pigs (usually small-scale) are rather dependent on collectors for selling the pigs because these producers are typically located in remote rural areas that are far from output markets. Traders of indigenous pigs are usually small-scale while those for crossbred pigs are mainly medium scale. Pigs are sold at traders' or farmers' houses. Some pig producers establish relations with traders and are said to receive higher farm gate prices, face lower price risks and incur lower transaction costs relative to those that do not have trading relations (Huong, 2007).

In general, informal contracts are mainly undertaken by smallholders with market intermediaries in the interest of getting assured supply of intermediate inputs and livestock services on credit. Guaranteed outlet for the output could be an additional feature such as the Indian dairy case (Birthal, et al., 2006), but could also be a missing component (Huong, 2007; Son, et al., 2007)

Determinants of Participation in Contracts

There is a limited body of literature that qualitatively documents the factors affecting the decision of smallholder livestock producers in developing countries to engage in contracts. There is an even more limited work on quantitative assessments on the determinants of participation in contracts. This section draws on the studies done by Birthal, et al., 2006; Fairoze, et al. 2006; Son, et al., 2007; Costales, et al., 2007; Tiongco and Delgado, 2007; and Tiongco et al., 2006. The focus is on smallholder producers of dairy products (milk), hogs and broilers in the case countries. At the end of this section is a discussion on the ex-ante motivations of small-scale producers in Zimbabwe (Masakure and Henson (2005) and in China (Miyata, et al., 2007) to grow non-traditional vegetables and apples under contract for export. While the focus may be on crops rather than livestock, the approach remains relevant for the purposes of this review.

Except in industrial-type broiler chicken production in Thailand and in the Philippines, formal contacts are not yet the norm in the production of livestock products in the case countries examined. Although independent smallholder livestock producers perceive benefits and advantages in engaging in contract production, the reasons for not being engaged in one pointed to perceptions on the non-existence of such offers in their own localities. If these offers existed, there were certain household and farm characteristics that did not make them qualify to be chosen, among which is the activity being small-scale.

3.3 Formal Contracts

Econometric estimation of the determinants of participation in formal contract farming in the case countries examined did not yield uniform directions of impact of significant factors influencing participation or non-participation.

Broiler

In India, after achieving a particular scale of production, gaining more experience in the activity, and having the support of non-farm income sources, producers tend to shift back as independent producers, possibly revealing that the terms of the contract are too stifling, and that there would possibly be higher value obtained from greater autonomy. Among Indian poultry producers, those who face lower opportunity cost of labor, who do not have other sources of income (and thus, can work full time in the poultry business) and engaged in small-scale production are more likely to participate in contract farming. The effect of experience (as proxied by age) in poultry production on the likelihood of participation, while yielding a significant but negative coefficient, was perceived by the authors to be indeterminate (Fairoze, et al., 2006; Tiongco, et al., 2006).

Pigs

For pig producers in Vietnam, certain demographic characteristics influence farmers' decisions to enter into various types of contracts. Those who are older, more educated and spend more time in raising pigs are likely to engage in formal or informal contracts with cooperatives. But those who already devote more time to the pig-raising activity are less likely to enter into informal contracts with non-cooperative agents such as feed traders or output suppliers. Furthermore, farmers who have large landholdings are more likely to engage in formal contracts in pig production (Son, et al., 2007). Thus, in pig production in Vietnam, low educational attainment, non-specialization in pig production, small landholdings, and small-scale of operation act as barriers to participation.

3.4 Informal Contracts

In informal contracts, there are also no common and uni-directional determinants of participation.

Pigs

In pig production in Vietnam, a strong determinant of participation in informal contracts is the acquisition of social capital, as captured by membership in cooperatives, whether these are livestock cooperatives or all-purpose cooperatives. Informal contracts are either with traders or with cooperatives. Farmers who are more likely to engage in informal contracts with a cooperative are those with higher levels of education, greater experience in pig production and specializing in the activity, and those who are farther away from the market centres. Son, et al. (2007) conjecture that higher levels of schooling suggest a higher capacity of the producer to process information that is important in weighing the pros and cons of engaging in contracts. Moreover, as pig production becomes a major income generating activity for the household, the linkage established by the producer with the intermediary in sourcing out the inputs or in marketing the animals becomes more stable and, therefore, this enhances participation. In theory, proximity of the farm to market centres should enhance participation in informal contracts but the results imply that reliance on informal contracts could be bridging the distance between farms and market centres. On the other hand, those who are less likely to participate in contract farming are producers that engage in grow-to-finish operations—a finding that is quite in contrast with formal contract growing where there is a predominance of farmers who are into grow-to-finish operations.

Dairy

In dairy production in India, greater experience in dairy production appears to be a human capital asset valued by integrators. The findings of Fairoze, et al. (2006) and Tiongco, et al. (2006) reveal that those who have more experience in milk production and are landholders are likely to engage in contract arrangements. Producers with more experience in milk production are hypothesized to be in a better position to analyze the benefits and costs of alternative marketing channels such as contract farming. On the other hand, landholders are usually involved in both crop and dairy farming and thus, there are competing uses of labor. Contract farming eases this labor constraint for landholders through easy access to milk markets. The price of milk in open markets in India is higher and large producers have economies of scale in marketing costs but smallholders face higher transaction costs in spot markets. Therefore, those with lesser dairy stock (milk stock) are more likely to participate in contract farming to reduce the cost of transactions in procuring inputs and selling milk.

In general, participation in contract farming reflects two sides of the coin: the hurdling of physical and human capital qualification barriers put up by the integrator, and the valuing by the farmer of the services provided by the contract arrangement as opposed to undertaking the production and marketing of the product independently. Even when options are there to engage in contracts, if the farmer deems he has what it takes to undertake the production and market risks on his own, and reap the entire fruits of the activity, he may prefer to operate as an independent producer.

3.5 Efficiency of Contract Farming

Transaction cost economics, in its treatment of the resort to vertical coordination of operations, asserts that when transaction costs are significant, economic efficiency gains could be derived from vertical coordination rather than engaging in spot markets. These could be reflected in gains in physical productivity, reduction in costs per unit of output, and gains in net returns per unit of output. Reduction in uncertainty of quality of output could also lead to the capture of the corresponding price premia by producers or suppliers. It has been recognized in the literature, however, that there are also transaction costs associated with hierarchical management of vertical coordination.

There is a wealth of literature on the qualitative impacts of contract farming on small-scale producers of *agricultural crops* in developing countries but the evidence is rather mixed. Baumann (2000) cites comparative reviews of Commonwealth Development Corporation or CDC (1989), Glover and Ghee (1992), Glover and Kusterer (1990) and Little and Watts (1994) in Southeast Asia, Latin America and Africa. These studies point to generally improved farmer incomes from contract growing, but on the other hand, deteriorating debt situations among households were also exhibited. Miyata, et al. (2007) confirm the positive effect of contract farming on incomes of smallholder apple and green onion farmers in China. However, there are questions and controversies regarding the extent to which contract farming displaces food production and its effects on food and nutrition (Dirven, 2006). Baumann (2000) also suggests an evaluation of the impacts of contract farming on a long-term basis since crop contract growers are normally shielded from risk in the first few years and therefore may indeed show positive impacts in the short run. There is also a dearth of studies that shed light on the proportion of smallholder livestock producers who are able to engage in and benefit from contract farming.

Key and McBride (2007) applied the Full Information Maximum Likelihood (FIML) sample selection model to estimate differences in farm productivity between contract and independent hog production operations in the US. Their analytical results confirm

that production contract was a “statistically and economically significant determinant of farm productivity”.

There is scarcity of work done with regard to the effects of contract farming on small-scale livestock producers in *developing countries*. Much of the previous work described the impact of contracts on smallholder livestock producers using net profit or cost and returns analysis (Chowdury, 2001; Karim, 2000 cited by Begum, 2005). Moreover, there are very few empirical studies that measure and rigorously analyze economic efficiency of livestock contract farming in developing countries with the exception, perhaps, of preliminary studies by Delgado, et al. (2003), Costales, et al. (2003), Poapongsakorn, et al. (2003), Mehta, et al. (2003), Begum (2005) and recent works by Birthal, et al. (2006), Fairoze, et al. (2006), Tiongco, et al. (2006) and Costales, et al. (2007). These few available studies generally conclude that smallholder livestock producers that are engaged in contract farming benefited from the contractual arrangements vis-à-vis independent growers in terms of more stabilized prices, higher output prices, lower input prices, higher profit per unit of output, assurance of market for their products, and lower transaction costs, among others.

In the case of broiler production, contract growers in Bangladesh received net returns that were almost two times higher than that received by independent farmers (Begum, 2005). This was attributed to increased productivity of broiler farmers stemming from financial, technical information and marketing support from the integrator as well as the sharing of price and production risk among the contracting parties. In contrast, Fairoze, et al. (2006) observed that broiler contract farmers in India had lower profit per unit of output than independent farmers. However, contract farmers had lower transaction costs and were assured of regular incomes that were shielded from fluctuations in market prices since growers' compensation was based on performance rather than on market prices. In this case, the stability of income flow was of higher consideration than the experience of lower income at one or another production cycle.

In the case of milk production and marketing in India, Birthal, et al. (2006) found that contract farmers received higher profits per unit of output than independent farms. The benefits of smallholders from contract farming also come from reduced transaction costs and provision of services and technical advice from the integrators.

For hog production in the Philippines, price per kilogram liveweight of slaughter hogs received by SIDC (cooperative) contract growers were 11 percent higher than those received by the independent producers. The higher prices for output embody both the cutting of middlemen margins and the higher quality of output. With the reputation of the cooperative as an institution that supplies good quality feeds and good quality hogs and pig meat, transactions are facilitated between the cooperative and its regular customers. With the cooperative taking up the transactions in the final market for hogs instead of the contract growers looking for their own markets, transaction costs are reduced (Costales, et al., 2007).

Along the same vein, to determine the impact of contract farming on net revenue or profit per unit output of livestock production, the approach used by Birthal, et al., (2006), Fairoze, et al. (2006), and Tiongco, et al. (2006) is to specify a treatment effects model. This is done to account for a possible sample selectivity bias in the estimation of impact since higher profit from livestock production could also be due to other factors that may have a two-way causality relationship (e.g., management skills or 'preference for autonomy') besides participating in contracts. The authors confirmed the assertion that participating in milk contract farming in India is more profitable compared to independent production. An improvement of the Key and McBride's (2007) approach done by Tiongco, et al. (2007) is to consider non-market costs of production such as environmental externalities.

Comparison of net returns per unit of output between contract farmers and independent producers in dairy, broiler chicken and pigs in the case countries of India, Thailand, Vietnam and the Philippines generated mixed results, although there are more instances where the advantage was on the side of the contract farmers. The cases where the reverse position occurred were in broiler contracts in India. This is consistent with the results in the determinants of participation where those with better human and physical assets, and with higher scale of operations, were independent producers. Those with lesser means could get into the economic activity with the assistance of contracts, with lower transaction costs, but at a price. In Vietnam, the comparative performance varied by type of pig production activity, and on whether exotic or mixed breeds of pigs were used. In general, participation in contracts, whether formal or informal, induced greater adoption of exotic breeds of pigs. The net income advantage of contract farmers, however, was more consistent in the raising of mixed breeds rather than with exotic breeds (Son, et al., 2007; Huong, 2007).

3.6 Effectiveness of Contract Farming

Against the backdrop of agricultural markets becoming more globally integrated, where the development of value chains are becoming an important feature in international trade in food products as well as in the growing importance of supermarkets in developing countries, contract farming has often been looked upon as a system that could integrate smallholder producers in rapidly developing mainstream markets (Sartorius and Kirsten, 2002). Thus, the effectiveness of contract farming arrangements as an institution could be viewed from the perspective of their success in involving smallholders in such schemes. However, the investigation on effectiveness should not just stop at the inclusion of smallholders, but must also assess whether the engagement in such schemes were, on the whole, beneficial for such households rather than lead them to lesser incomes, or even to impoverishment.

In their review of cases of contract farming in various commodities in developing countries, Sartorius and Kirsten (2002) identified some success stories but many instances of failures. Relatively more studies on the effectiveness of contract farming in the production and marketing of agricultural crops can be found in the literature than there are in the case of livestock. A strong criticism in the case of crop farming is that contract farming does not benefit the poorest part of the rural population, besides providing employment indirectly (Baumann, 2000). Most studies have classified smallholders as the 'middle peasantry' (Dirven, 2006). Recent evidence indicates that with the rise of supermarkets and convenience stores, market outlets for small-scale farmers seem to be shrinking, even for fruits and vegetables. Indeed, large buyers such as supermarkets, agro-industries and exporters prefer to buy from medium to large scale farms not only because of "productivity, quality and reliance reasons, but also strongly because of transaction costs due to size, location, weak infrastructure and cultural differences". This has been verified to occur even for intermediaries that sell on the wholesale markets (Dirven and Faiguenbaum, 2003). In Latin American countries, because of the increasing market share of supermarkets, the proportion of the total market to which small farmers can sell is alleged to be shrinking, at an increasing rate. A study by ECLAC (2006), elucidated that, "This shrinking market is happening at a much faster rate than the rate at which countervailing measures have been developed for Latin American small farmers such as the development of niche markets and the strengthening of clusters, associations, networks, contract farming incentives, plus all the activities to bring productivity, quality, good practices, traceability, etc. up to par to ever changing and more demanding requirements". Moreover, contract farming has not really empowered smallholders because the farmers' organizations that emerged tended to regulate smallholder production. The comparative reviews on crop contract farming reveal that contract farming indeed

contributes to smallholder income in the *short run*. But this increase in incomes are not sustainable in the long run because such gains have to be offset by income spent on food and labour and unsustainable levels of risk (Baumann, 2000). Another strong criticism is that contract farming is just another form of exploitation with limited equity impact, increasing socio-economic differences and evidence of some unsuccessful schemes and problems for many outgrowers (Glover, 1987).

Along the same argument, Runsten and Key (1999) claim that more than being exploited, small scale farmers in Mexico were shut out of lucrative enterprises such as export fruit and vegetable production, and were often discriminated against in domestic supply systems. Furthermore, smallholders did not have easy access to financial capital as "capital had studiously avoided dealing with them".

In Thailand, contract farming in crop production failed because of the very rapid development of the Thai agricultural sector. Thai contractors and growers were found to prefer the 'quotaman system' to cope up with the fast market. This is an informal system of vertical coordination where an intermediary (quotaman) is able to provide access to small producers through personal contact when necessary without the formality of a contract. Quotamen were deemed to be better judges of the creditworthiness of growers and their margins are not taxed. Companies' risks are spread and sources of supply are diversified through the services of the several quotamen (Baumann, 2000).

Kirsten and Sartorius (2002) present further review on the evidence of agribusiness firms' preference to deal with larger farmers in order to decrease transaction costs and achieve greater consistency of quality and supply. Citing various studies (Von Braun & Immink, 1994; Little & Watts, 1994; Runsten and Key, 1996; Pasour, 1998; and Coulter et al., 1999), they found that processors preferred to deal with large farmers that had access to good infrastructure, communication and transport systems as these farmers were more geographically concentrated than small farmers and hence, procurement costs would be reduced. Large farmers also tend to be better educated and have higher levels of capitalization and management skills. With these characteristics, large farmers are more likely able to adopt technology with minimum supervision and monitoring, are able to acquire specialized capital inputs more easily, and have the capacity to supply larger volumes of the output. Given these considerations, large farmers are perceived by integrators to have higher chances of success and therefore dealing with them also entail lower transaction costs and lesser risk. Small farmers, on the other hand, would require more intensive monitoring and have to make more frequent deliveries of smaller quantities to the processor. Thus, per unit cost of the output supplied tend to be higher. In terms of screening potential contract growers, integrators obviously find it more costly to have to screen more individual small farmers than one large farmer. In contrast, the recent work of Miyata, et al. (2007) find no evidence of preference of agribusiness firms/processors for large apple and onion producers over small farmers in China. These findings, however, have to be taken within the context of the predominance of small farms in China in general, and in the specified region of the study in particular.

In the case of livestock, Tiongco et al. (2006) observed that an integrator's transaction costs are incurred on a per grower basis and do not depend on the size of the farm, which makes it valid for them to contract out with larger farms in order to lower their cost of procurement or to lower cost of default. The results of this study provides empirical evidence to the criticism that contract farming discriminates against smallholders so as to avoid costs of negotiation, monitoring and enforcement of contracts with a large number of them (Glover and Kusterer, 1990, Little and Watts, 1994, Key and Runsten, 1999, Singh, 2002; Camargo Barros, et al., 2003).

In the Philippines, the major hog industry integrators prefer to contract out with large-scale farmers than with smallholders to minimize costs in the delivery of inputs and services and in monitoring grower's management on farm. It is in the interest of

the integrator to do business with larger-scale hog producers because “logistics and monitoring will be a total nightmare” if there will be hundreds of geographically dispersed smallholders to deal with.⁴ Besides the logistical and monitoring cost consideration by integrators, the minimum 300 piglets per batch that these integrators require of potential contract growers is prohibitively costly for smallholders to comply with. This investment on animal stocks alone will cost each smallholder an average of PhP 300,000 (about USD 7,500 at the current exchange rate of USD 1: PhP 40). Complementary housing facilities and structures will significantly add up to investment cost. Clearly, small scale hog producers tend to be shut out from participating in this kind of formal contract.

Similarly, in Brazil, anecdotal evidence suggests that many of the small-scale hog farms exited the livestock sector in the temperate South after they took out loans to increase the size of their operations at the request of integrators. However, integrators refused to renew contracts with producers of only a few animals, and hence, these smallholders had to default on their repayment. Integrators were wary of renewing contracts with smallholders because of the increased costs being experienced associated with providing technical assistance, delivery of inputs to and pick up of the final production from many small contract growers. Thus, “increased contract farming may actually promote scaling-up rather than serve to maintain smallholder farming” (Delgado, et al. 2008). The same view is shared by Da Silva (2005).

In the case of pig farming in Vietnam, even for informal contracting such as that existing among indigenous pig raisers, Huong (2007) found that smallholders had weak negotiation capacity arising from unfavorable conditions of crucial production and marketing factors such as infrastructure, storage and information systems as well as lack of integration among producers themselves. Traders are aware of their more advantageous position and often resort to opportunistic behavior such as offering lower farmgate prices to price-taking smallholders.

On the other hand, Son, et al. (2007) found that in Vietnam, traders particularly input suppliers, have higher preference for larger-scale producers in the initial stage of engaging into informal contracts. But when contracts are up for renewal, the overriding factors of the farmer’s reputation of timely payment and delivery of the contracted output are given more weight than simple scale of operation. This finding is confirmed by the analytical results that showed scale of production as not being a decisive determinant of participation in informal contracts. Hence, smallholders are not automatically excluded from participating by being ‘small’ per se.

The very scant literature that focused on the investigation of the effectiveness of contract farming in livestock products along these lines point to the need to undertake more in-depth studies to obtain more robust conclusions. A limitation in most of the literature on the impact of contract farming is that, while most smallholder livestock production in developing countries takes place under mixed livestock-crop production systems, studies focused solely on the performance of the livestock economic activity undertaken under contract. Under conditions where the farm activity is not specialized and various farm activities compete for limited household labour and other resources, improvements in income from more intensified livestock production under contract may lead to a reduction in household resources used in the other economic activities. This could then lead to a significant reduction in income in these activities, respectively. Of the few studies available, one is not on livestock but on contract farming with smallholders in fruits and vegetables in China, where contract farming does improve incomes both at the activity level and at the household level (Miyata, et al., 2007). Another study is on informal contracts in pig production in rural Vietnam, where contracts improve pig production income but the

⁴ Personal communication with major integrator in the hog industry, July 2007.

same conclusion cannot robustly be said about the total household income level (Huong, 2007). This may be a function of the share of livestock income in the total household income derived from all sources. This could be pursued for further investigation, classifying farmers according to the relative importance of the livestock economic activity in the household income.

Another angle on investigating the effectiveness of contracts in integrating participants into the mainstream supply chains is looking at the longer term impacts of engagement in contracts on activity performance, i.e., the stability of incomes derived over time. The literature on contract farming in developing countries is not yet rich along these lines. There are a few literature in the US broiler industry in particular, with perceptions of an imbalance in the terms relating to the distribution of production risks as unfairly tilted against growers, where contracts were on an annual basis, with no certainty for renewal. This prompted a reinvestigation on the legal aspects of such contracts, and on the extent to which particular contracts incorporate more 'grower-friendly' provisions that improve the terms in the grower's favour (Schrader and Wilson, 2001; Hamilton, 2001). Notable is that these are documented cases in an industrialized country setting where the nuances of contract growing are already very much advanced, and the legal framework for contract enforcement is already one of the most sophisticated. Formal contracts in broiler and industrial-type pig production in less developed countries more often than not are adaptations of contract terms from developed countries. In less developed countries, one can assert that the terms of formal contracts in broiler and industrial-type pig production are even more tilted in favour of the integrators as they could put to their advantage the asymmetry of information about the markets over producers, and exploit their stronger bargaining position over individual farmers, where the legal and institutional framework to enforce contracts is relatively weak. The perceptions by formal contract growers of the inequity of terms is confirmed in the case studies on broiler contracts in India and in Thailand, and fixed-fee contracts in industrial-type pig production in northern Vietnam. In Thailand, the shift toward guaranteed forward-price contracts in broiler production appears to have stemmed from the dissatisfaction with the fixed-fee contracts. In all cases, however, contract growers indicated preference for continued engagement in formal contracts, albeit with more favourable terms.

Finally, a third angle in investigating the effectiveness of contract farming as a system that integrates smallholder livestock producers into the growing mainstream markets is determining whether or not contracts exhibit a scale bias. This is done by looking at the composition of contract growers with respect to scale of production in contrast with independent producers. In the case countries compared, for formal contracts in broiler and industrial-type pig production, it was often the case that there were minimum capital and scale requirements, the size of which varies depending on the level of development of the particular industry and on the predominant scale of production in each country.

In northern Vietnam, even in informal contracts with cooperatives, majority of the participants were medium- to large-scale pig producers, with a minimum amount of cash contribution up front for membership in the cooperative to finance contracts with the feed supplier/wholesaler, as well as to finance cooperative services for livestock production to members.

Tiongco, et al., (2006) revealed that the benefits of contract farming are not scale-neutral. Economies of scale in Indian dairy (milk) farming is an important determinant of competitiveness although within similar scales, smallholders are said to derive benefits from contract farming via the reduction in transaction costs. For milk production and marketing in India, Birthal, et al. (2006) observed that large producers benefited from contract farming more than smallholders primarily due to scale economies in utilization of family labor in production and in the disposal of milk.

Technological requirements and investments in facilities are also not scale neutral. Delgado, et al. (2008) found that in the case countries studied (Thailand, Philippines, Bangladesh and Brazil) there has been a rising demand for livestock products containing specific food safety and quality attributes, probably linked to increased urbanization and income levels. Large scale swine and poultry producers are able to meet these changing consumer preferences through vertical coordination. Large-scale dairy producers and dairy cooperatives have been successful in establishing market trust and reputation. For smallholders to remain linked to this growing market by establishing the same credibility for their products, they will need to be more systematically integrated into high value chains via contracts or institutional arrangements that have processed-based food safety systems in place and that can deliver some form of certification that is institutionally recognized. But the technologies that ensure food safety and quality standards may not be scale neutral as in the case of the Brazilian study where the existing technology on farm chilling and milking technologies of smallholders could not meet the volume required by dairy processors in recent years.

For informal contracts, there is generally a greater flexibility by market intermediaries in accommodating smallholder producers, as evidenced in dairy contracts in India (Fairoze, et al., 2006) and in pig production in northern Vietnam (Son, et al., 2007). In these cases, the 'reputation' on the ability of producers to keep the agreement carries greater weight than simply the scale of production of the farmer.

There are, however, cases of formal contracts in fruits and vegetables, and also in industrial-type pigs in a few countries, where integrators do engage in contract with smallholders. In these cases, it is the human capital and the quality of physical assets to successfully undertake the activity that mattered, rather than the scale of production *per se*. In addition, the proximity between the integrator and the farmer, the social capital that connects the two parties to the contract, and the element of trust provide for enduring production-marketing relationships. These cases, however, are the exceptions rather than the norm.

4. CONCLUSION AND WAY FORWARD

4.1 Conclusion

The theoretical bases in transaction cost economics and other complementary approaches on the resort to vertical coordination rather than through spot market transactions in the sourcing of a vital input by processing firms are quite on firm ground, although there are competing approaches that are recognized. However, while the theoretical literature points to an array of alternative vertical coordination schemes according to the degree of hierarchical governance in transactions, the literature on the applications of contract farming in agriculture and in livestock production have dominantly concentrated on contracts of a particular form – the formal contract. Even in the categorization of contracts on what part of the production process is under contract between integrator (contractor) and producer (contractee), or in the dissection of the terms of contract on how benefits and risks are shared, the object of study still mostly refers to formal contracts.

The attention on formal contracts is directly linked to the growing importance given to the analysis of high-value agricultural supply chains in their role of responding to structural changes being brought about by the increasing globalization of agriculture and the emergence of supermarkets, and the concern on how smallholder producers in developing countries can be included in domestic and international trade of high-value products, in a regime where standards on product quality and food safety are increasingly coming into play. Under these conditions, attention is given as to how contract farming accomplishes a number of tasks at various control points along the supply chain related, but not limited to the following: consistency in delivering a required volume of the output, producing a product with particular quality attributes such as freshness, uniformity, texture and taste. Other requirements may include that products are certified to have been produced in an environmentally friendly manner, or that they have passed food safety standards in types of inputs used, or in the production processes adopted.

The literature on the various applications of contract farming in crops and in livestock, indicate that in general, contract farming is an important mechanism in its relative success in accomplishing the tasks as laid out above, and in delivering the products demanded by export markets, as well as high-end markets in the domestic scene, as mediated by the growing supermarkets in developing countries. On the side of the contract farmers, most of the studies do point to the greater access to high-quality inputs and services, and higher activity net returns per unit of output registered by contract growers as compared to independent farmers producing the same product, although there are cases where the reverse has been exhibited with respect to net returns.

In terms of the effectiveness of contract farming in integrating smallholder livestock keepers in mainstream markets in developing countries, the literature reveals that in general, formal contracts between large integrators and contract growers tended to choose medium- to large-scale producers. Under situation-specific conditions, however, where the dominant production scale is small, integrators have to contend with engaging into contract with smallholders, but screen them according to their physical and human capital, i.e., their capacity to deliver the required output.

On whether contract farmers obtain longer-term benefits in terms of the sustainability of net returns, the scant literature that has explored this has mixed results. In general, these are country-specific, depending on the relative distribution of market power between integrator and the farmer, the level of development of the institutional and legal system in the enforcement of contracts, and the latitude of

options of farmers as conditioned by their physical, human and social capital to undertake production independently or engage in contracts with other parties.

The review also concludes that there are very few studies that have explored informal contracts between livestock producers (or crop farmers) and their intermediaries. In the context of integrating smallholder producers in developing countries to mainstream markets, the richness of analyses on formal contracts involving high-value products and high-end markets also mirrors a gap in knowledge and understanding on how other forms of vertical coordination do function to link smallholder producers to markets that are vital to their livelihoods. Moreover, there is a dearth of information on how these informal alternative market governance structures are able to link smallholders in a way that transaction costs are also reduced, and by implication, net incomes from the transaction increased, and contrast them with the performance of formal contracts in the same locations.

4.2 Way Forward

This review proposes to refocus the field for deeper investigation in the areas where smallholder livestock producers predominate as stakeholders and where a knowledge gap is identified, namely, (i) in the area of contracts outside the boundaries of formal contract growing schemes, and (ii) in the realm of differentiated livestock products outside the narrow confines of high-value industrial-type livestock products for export markets and domestic supermarkets. These two areas are strongly related.

Informal Contracts and Other Institutional Market Arrangements for Smallholders

Given the scale bias of formal contracts toward larger farms in terms of household participation in such market coordination schemes, it will take quite a lot of public and non-government investments to raise the physical capital and knowledge and skills of rural smallholder livestock producers currently excluded from formal contract farming schemes to a level of capacity that would attract business oriented integrators or processors to prefer to engage in formal contracts with smallholders over larger-scale producers. Schemes that attempt to integrate smallholder producers via this individual farmer capacity strengthening scheme could easily break down once a single weak link in the integrated relationships along the supply chain that is unaddressed comes to the fore.

Exploring deeper into other, more informal forms of contracts or institutional arrangements that already link smallholders to their markets has the advantage in that such contracts are, in fact, more prevalent than formal contracts in developing countries in terms of incidence and their inclusion of smallholders is more widespread than do formal contracts. What is needed is getting them to the forefront and investigating them more systematically using the richness of the current methodologies within the framework of the New Institutional Economics in general, and transaction cost economics in particular. Within this framework, alternative forms of contracts outside the formal schemes could be investigated in how well they directly address the transaction cost problems (information asymmetry and opportunistic behaviour) associated with transacting with smallholders relative to larger-scale livestock producers in matters related to transaction characteristics (asset specificity, uncertainty, frequency) that influence the preferred general mode of governance in the coordination of transactions.

In developing countries, particularly in rural societies, the formal institutions and legal framework for enforcing formal contracts are not yet that firmly developed. Within this context, the stability of economic transactions are influenced more by

trust-based relationships built upon the increasing frequency of successful transactions, by the negative impacts of social sanctions on breaching trust, and by the high cost of searching and switching to more reliable transaction partners who could give higher returns. Deeper investigation on more informal forms of contracts should take these deeply-rooted social norms and exploring their potentials as social capital that smallholders and their contract partners can exploit in the development of alternative market institutions that efficiently and equitably perform the task of raising the level of market access by smallholder livestock producers beyond those that are obtainable from infrequent and ill-informed transaction in spot markets. One of the informal institutions that could be the subject for deeper investigation on its economic and social functions in market intermediation and in addressing transaction cost problems with smallholders is the 'farmer organization'. While reviews on the successes of 'farmer cooperatives' in developing countries have given mixed results, it could be high time to investigate them more systematically using the framework developed in the analysis of contract farming, identify where they could best fit in market intermediation, and also identify the areas of policy change that would build the institutional framework to encourage their formation and exploit their comparative advantage.

Differentiated Non-Industrial-Type Livestock Products for Domestic Markets

The study of contract farming has been closely associated with the objective of making smallholders able to participate in the emerging and fast growing supply chains for high-value products for export market and for supermarkets and other high-end outlets in the urban centres of the domestic market. The premise is that smallholders must be able to meet the requirements of the growing demand for differentiated products, with characteristics of high quality and meeting the standards for food safety.

The area of high-value livestock products for exports and for supermarkets, however, has for long not been the realm of the vast majority of smallholders, nor will it become so in the near future gauging from the distance between capacities that are needed to meet formal standards for product quality and food safety and the capacities of smallholder livestock producers and the informal market institutions they rely upon to engage in trade with their products. For most developing countries, the high-value component of livestock products output destined for exports and for supermarkets constitutes only a minor proportion of total market share of the respective marketed output.

On the other hand, there is that large part of domestic market demand for livestock products outside the classification of high-value or high-end products, by significant sections of households in main urban centres as well as regional markets, toward which most smallholder production is directed. For these consumers, demand for qualitatively differentiated products is also expressed in terms of freshness, taste, flavour, texture, and other characteristics that are normally associated with non-industrial-type of livestock breeds or production processes (e.g., fresh milk, native chicken, eggs of native chicken, local small ruminants meat, non-industrially-produced pig meat; traditionally processed meat and dairy products, among others), and they are willing to pay for some price premium to obtain the products with desired qualitative differences.

The concentration of studies on formal market coordination mechanisms (e.g., formal contract farming) reveals a stark contrast in the dearth of systematic investigation in market coordination mechanisms in dealing with the demand for differentiated livestock products of a much wider range in domestic markets, and the supply of the same by domestic producers in general, and by smallholders in particular. The growth of such domestic markets for differentiated livestock products, and the development

of alternative institutional market arrangements that would more efficiently communicate information on product differentiation (quality, production process, food safety), and a system to guarantee credibility of such qualitative differences, should work to create value where it is due, and provide incentives for smallholders to create greater value in the livestock activities that they currently undertake. At the same time, the development of such domestic market would also offer consumers of all income brackets a wider range of livestock products to choose from, not just between supermarket brands but between supermarket products and another class of domestic livestock products with well defined qualitative and price differences.

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