

Food Marketing Policy Center

Vertical Coordination in the
Agro-Food Industry and Contract Farming:
A Comparative Study of Turkey and the USA

By Erkan Rehber

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University of Connecticut
Department of Agricultural and Resource Economics

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Preface

In this study, first, vertical coordination theory is briefly reviewed focusing on contract farming. Principle reasons for contracting, failures in contractual relationship as well as different approaches to contract production are examined in the light of coordination theories. Second, practical applications of contract farming are investigated, based on comparative analysis of experiences in Turkey and the USA, to point out related problems and required conditions for successful implementation, especially for the Turkish Food Industry.

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1. Introduction

Major structural changes have been occurring in the agricultural-food system (agro-food). The advanced agro-food sector is considered as a chain of interrelated activities from input suppliers to consumers while the traditional view of agribusiness considered only activities beyond the farm-gate. These changes are driven by changes in food consumer preferences and attitudes, technological improvements, food safety issues and related regulations, and changes in the farming structure.

In developed countries, it is observed that while the importance of agriculture in population, national income, export and employment has been decreasing, the share of the processed food supply to the consumer is increasing estimated to be about 60% of consumption on average. In such a system, of course, the agro-food industry is based on market oriented intensive agricultural production and well coordinated and organized market structure.

Vertical coordination has gained attention in the food system as a device for providing both cost and product quality advantages (Roy 1963). The agro-food sector can be conceptualized as a system of vertically interrelated stages. These stages are tied together through a variety of activities and institutions ranging from the sale of intermediate goods via arms length transaction agreements to consolidation of two or more stages under the common management of single firm i.e., vertical integration. Briefly vertical coordination encompasses all means of harmonizing vertically interdependent production and distribution activities ranging from spot markets through various types of contracts to complete integration (Frank and Henderson 1992). Between these extremes, the one which entails the most direct relationship between large corporations and small farmers is contract farming.

This system is widely used in developed countries where it accounts for about 15% of agricultural output (Glover 1990). For instance, in the U.S., 32% of the total value of agricultural production was produced under contract arrangements (Perry et al. 1996). In Japan, 75% of broiler output was produced under contracts in 1989 (Yi et al.) In the EU, the production aid system has been encouraging contract farming (Anonymous 1984). For example, in Germany, vertical integration through contract production is already common in dairy, poultry and sugar processing accounting for approximately 38% of the agricultural production (Grosskopf 1994).

Economies of the developing countries are mostly agricultural based. Development of agriculture from a

traditional structure to a market oriented structure is the major challenge for them. The main struggle is to decrease the rate of population engaged in agriculture to a certain amount through creating new employment opportunities either in non-agricultural sectors; such as textile industry, services sector etc., or agricultural based industries such as food processing. For developing countries, it is generally agreed that food processing is a key industry which should receive high priority both at national and international levels (Anonymous 1981). Moreover, food industry development promotes development in other sectors through forward and backward linkages. In these countries, the food-processing industry is important to economic growth and to the health of people. Many food raw materials in these countries are not fully utilized, foods are imported, food shortages exist and diets are inadequate. Developing countries such as Turkey must develop their food resources more extensively (Anonymous 1969). The development of the food industry not only provides new job opportunities and increase national income via accruing value added but it also is the way to supply safe and adequate processed food to consumers.

One of the important pre-conditions for the development of the food industry is the availability of processed food demand in both domestic and foreign markets. On one hand, the existence of plants which have modern technology and are economically viable to process agricultural produce is important. On the other hand, providing continuous, safe and ample raw materials is vital for the establishment of a sound food industry. That is why the vertical relationship between farm firms (i.e. growers and producers) and processors or traders of agricultural commodities is very important.

Current efforts to improve agricultural performance in developing countries tend to emphasize two instruments: technological innovation and alteration of macro policy framework (Glover 1987). Although both are usually necessary conditions, institutional innovation also has an important role to play. Acting in an organized manner in agricultural production and marketing will serve to create an efficient coordination among the chains in the food system from producers to consumers.

As a means of coordination; contract production has traditionally been considered a feature of an advanced capitalist agricultural structure but it also represents an expanding and much suggested method of agro-industrial integration for developing economies. Contract farming has also been promoted over the last three decades as an institutional innovation to improve agricultural performance in less developed countries sometimes as a key element of rural development and/or

settlement projects (Ghee and Doral 1992). Its use in developing countries such as Turkey has been significantly increasing.

In the industrialized food system, the impersonal structure of the free market mechanism is replaced by an organized and controlled personal relationship varying from short term contractual arrangements to complete vertical integration. These methods of vertical coordination of the advanced agro-food structure have many advantages, but are subject to some inherent implementation problems.

Related problems can be considered in two main groups. First, complicated structural relationships between the different stages in a vertical channel and the actors in the channel require theoretical analysis. The second group deals with practical issues. Which conditions are needed for each type of coordination? When and to what extent do such conditions occur? Who will have the control of these coordinated systems? And how will the benefits and risks of such a linkage be shared among the participants? These questions must be answered. From the farmers' point of view, reduced independence and lack of market position in the more concentrated raw commodities markets are problems that require feasible, practical and fair solutions.

In this study, first, I review current vertical coordination theories focusing on the theoretical background of contract farming. Principle reasons for contracting, advantages and failures of a contractual relationship as well as different types of contract production are examined in the light of integration (coordination) theory.

Second, I will investigate the practical application of contract farming to point out related problems and required conditions for successful implementation based on comparative analysis of experiences in Turkey and the USA. The first is a developing country which has a promising food industry and the second has a developed industry which has a heavily industrialized food system. The general structure of the food industry and experiences of contract farming in the USA are investigated based on the available publications and empirical research. The general structure of the food industry and contract farming in Turkey are studied based not only on available publications and studies but also the empirical data obtained by field survey. This field survey was conducted in a region where the main food processing plants are located. In that survey 25 firms and 91 growers were interviewed. In addition, 25 examples of production contract were examined. A breakdown of the 25 firms by sub-sector is as follows: Vegetable oil, 2; frozen food, 1; canning and tomato paste, 13; dairy, 4; olive processing, 2; beet-sugar, 1;

hop processing, 1; other, 1.

Finally, development of a contract farming model is proposed.

This study has five chapters. Chapter one serves as an introduction. Chapter 2 presents a short review of integration, vertical coordination concepts, vertical coordination theories and contract farming. The general overview of food industries and rather detailed information about contract farming both in Turkey and the USA are presented in chapter 3. A comparative evaluation of findings about the general structure of food industries and contract farming implementations in Turkey and the USA are also given in chapter 3. Before the conclusion and suggestions in chapter 5, a contract farming model is presented in Chapter 4.

2. Theoretical Background of Vertical Coordination and Contract Farming

2.1. Integration and Vertical Coordination

Primitive agriculture was a fully integrated system. In subsistence agriculture, vertical integration is nearly complete since most of the production resources and production decisions are in the same hand (Penn 1958). One family would collect seed, sow, and reap a crop, rear and fatten an animal, and themselves consume the produce after reserving seed or breeding stock for the following year. The evolution from subsistence farming to present market oriented agricultural system has been marked by a gradual disintegration of functions. Specialization is one of the distinguishing features of today's commercialized agriculture.

Agriculture as a production industry is closely related to marketing activities which transform, transport, and transfer food and fiber to the consumer. Additionally agriculture is served by a large number of industries which are supplying farm inputs.

Nowadays, coordination and/or integration between farms and the others firms in the industry in different dimensions is a reality. In other words, in advanced agriculture, there is a strong tendency toward close vertical coordination.

Integration means bringing together two or more parts into one. There are three basic kinds of integration. **Vertical integration** occurs when a firm combines activities unlike those it currently performs which are related to them in the sequence of marketing and production activities. Such integration could be illustrated by the meat packer who decides to reach both backward, toward the producer by operating his own livestock buying points in the countryside, and forward, toward the consumer by operating his own meat wholesaling firm (Kilmer 1986). A rather detailed

concept of vertical integration will be discussed later in this chapter.

Horizontal integration occurs when a firm gains control over the firms performing similar activities at the same level in the production and marketing sequence.

Firms often expand both vertically and horizontally. If both vertical and horizontal operations are tied together this is called **circular integration**. Local dairy cooperatives which are brought under a regional union illustrate this. When organizing dairy farmers under a dairy cooperative, vertical integration has occurred. At the same time, if dairy cooperatives are organized under a regional cooperative union, a horizontal integration has occurred.

Another type of organizational expansion which occurs when agencies or activities that do not have any direct relation among them are brought under a unified management, this is called **conglomeration**.

The terms **vertical coordination**, vertical integration and contract production are often used interchangeably (Cramer and Jensen 1988; Paarlberg 1995; Cramer et al.1997). Of course vertical coordination is a rather broad term which encompasses all means of harmonizing vertically interdependent production and marketing activities ranging from spot markets through various types of contracts to complete integration (Frank and Henderson 1992).

An efficient way to review vertical coordination in one industry is by studying the extent of the transfer of decision and the ownership of the firm assets. When all the decisions and assets of the firms are taken under a single firm's control, that ownership is called ownership integration or merger. **Vertical integration** is best reserved for ownership integration where two or more stages in the process of production and marketing are effectively controlled by a single management. This term also refers to a technological rather than an institutional development (Trifon 1959).

In contrast, when each firm retains its separate identity but leaves one or more decisions of production and/or marketing under the control of another firm, that is called **quasi integration** or **contract integration**. Sometimes it is called **vertical restrictions**. "A non-integrated firm may write long-term, binding contracts with the firms which it deals, in which it specifies price and other terms. Such contractual restraints are called vertical restrictions" (Carlton and Perloff 1990, p. 502).

An agricultural production and marketing system includes different stages or sectors: suppliers of input items, farm operator, processor of farm products, distributor, and final consumer. In the Western World, the relationships and transactions between these sectors could be realized in different manners (Allen 1972). In

agriculture, four types of vertical coordination between farmers and off-farm businesses are generally recognized (Berkama and Drabenstott 1995).

i. Coordination without any contract (market coordination): The prevalent existence of spot market or open market transactions is known as market coordination. Spot market or traditional free marketing system still accounts for the lion's share of the present world marketing system.

In this relationship there is no written or oral contract between firm and the farmer for both buying or selling. Here, the farmer buys supplies from whom he chooses and sells his products to whoever will pay the best price. This type of vertical relationship provides freedom to farmers but uncertainties both in buying supplies and selling produce are the main drawback. In a competitive open (free) market system, price signals control the market mechanism. The message reflected in price would be passed back to the processor from the final supply points (super markets or groceries), to the farmer and then to the supplier of input items. This system may work very slowly.

This traditional form of market organization and price determination will remain the appropriate means of coordinating the links in the system if certain conditions are available;

- Production occurs close to the points of final consumption.
- Control over short term variation in prices and sale volumes exist either through government or producer organizations.
- Imprecise grading is acceptable for the purchaser.
- Agricultural extension and advisory services as government functions are sound and effective.

For instance, contract farming rarely exists in grain, oilseeds and cotton production which have been subject to government price and/or income support programs. Farmer contracts for delivery of a specific quantity at a specific price, time, and place (ordinary forward and futures contracts) are considered a part of market coordination (Schrader 1986).

ii. Contract farming: This contract/integration system is described as the most profound system (Paarlberg 1995). Contract farming is sometimes called quasi integration. British and American approaches are different in this subject. British literature has drawn a sharp distinction between contract farming and vertical integration and regard one as an alternative of the other (Barker 1972), preferring to restrict the meaning of vertical integration to what has been called "ownership integration". American practice, in particular, has been to regard contract farming as a form of vertical integration (Allen 1972).

iii. Vertical integration: In this type of coordination, each individual farm loses its identity and becomes a company owned farm. The parent company owns or leases the land, buildings and equipment and employs its own employees. A firm can be described as vertically integrated if it encompasses two single-output production processes in which:

- The entire output of the first process is employed as part or all of the quantity of one intermediate input into a second process or,
- The entire quantity of intermediate input into second stage is obtained from part or all of the output of the first stage. This can be called as **full integration**¹.

This description may include more restrictive criterion where the entire output of upstream process be employed as the intermediate input into the downstream process. It can be replaced the case in which most of the output of upstream process is employed as most of the input in the downstream process. This case is best described as “**partial vertical integration**” (Perry 1989) or **taper integration**. Thus, inherent in the notion of vertical integration is the elimination of contractual or market exchanges and the substitution of internal exchange within the boundaries of the firm.

Vertical integration also means the ownership and complete control over neighboring stages of production or distribution. Grossman and Hart (1986) have argued that vertical integration is the ownership and thus complete control over the assets. But, because of the different nature of the labor input, it is not relevant for vertical integration. The workers could be employees or contractors without altering the degree of vertical integration.

On the other hand, Williamson (1973) and others have stated that vertical integration would encompass the switch from purchasing inputs to producing those inputs by hiring labor. The required capital for production, such as building and equipment, could be owned or leased without altering the degree of vertical integration. Leasing of capital can allow control of production without ownership, but this approach is not enough to explain vertical integration. Vertical integration is control over the entire production or distribution process rather than control over any particular input into that process.

Vertical controls characterize vertical relationships between the two extremes of vertical integration and

spot market exchange. A vertical control arises from a contract between two firms at different stages which transfers control of some, but not all, aspects of production or distribution. However, vertical control and quasi integration are intimately related to vertical integration (Perry 1989).

Vertical integration may arise in a number of ways. **Vertical formation** describes vertical integration which occurs at the time the firm is created. **Vertical expansion** describes vertical integration which occurs as a result of internal growth of the firm creating its own subsidiaries of the neighboring stages. **Vertical merger** describes vertical integration which occurs through the acquisition of one firm by the existing firm in a neighboring stage.

iv. Farmer Cooperatives: An agricultural cooperative is an organization usually incorporated, owned, and controlled by agricultural producers, which operates for the mutual benefit of its members as producers or patrons (Rehber 1984). One world-wide way of vertical coordination is of course cooperative organization. Organizing under an agricultural cooperative or producers’ group is also a type of ownership integration. By working together in their cooperatives, farmer-members can better control their destiny (Ling and Liebrant 1995).

The consequences of farmers’ participation in the cooperatives would provide them easily access to available markets, enhanced net returns and countervailing power when facing anti-competitive market forces (Petraglia and Rogers 1991). On the other hand, the possible existence of a competitive yardstick effect for cooperatives has long been considered (Cotterill 1987). In cooperative structure, because of the fact that producers as the supplier of the raw materials are also the owners of the processing units, it can be thought that the relationship between the farmers and processors do not create problems any more. But it is not a correct approach. In practice this type of coordination could also be the cause of problems and disputes especially when the alternative marketing opportunities are available. To avoid such problems in cooperatives, contractual relationship with members farmers is advisable (Royer 1995).

Farmers can also be organized under bargaining cooperatives to have power at the bargaining table when setting the terms of contractual relationships. Managing supply and controlling nonmember free riders are considered the main problems of such organizations (Iskow and Sexton 1992). Despite these problems, they have been a balancing power and a beneficial force in improving the degree of competition in the many of the agricultural commodities markets (Cramer et al. 1997)

¹ **Full integration** refers to selling all of the outputs, or providing all inputs in-house and **taper integration** refers to selling some proportion of outputs to or buying some inputs from outsiders (Harrigan 1986 p.538).

2.2. Theories of the Vertical Coordination

The food system from farm to the consumer table has been traditionally operated in an open market system relaying on the price signals. However, considerable close cooperation-coordination has been observed in food systems as they move from arm's-length or open market transaction toward pure vertical integration.

There are several theories that are used to study vertical coordination and no conclusive theory yet exists (Azzam and Pagoulatos 1999). Each theory focuses on different aspects, applies different explanation mechanisms and reaches different outcomes and managerial implications.

Traditional microeconomic theory provides limited help because it assumes open markets and independent firms react to determined market prices. Concepts of industrial organization are only partially helpful in that they assist in understanding the relationships between structure and performance but do little to explain dynamics of firm behavior and interactions between or amongst firms. Behavioral science may provide rather comprehensive framework to study vertical coordination involving the theories of transaction cost and principal-agent, strategic management, negotiating power, and performance incentives.

Some of the more reliable considerations on theory of vertical coordination, in general, are summarized below. The issues of vertical coordination and contract farming can be easily understood and analyzed in the light of a combination of different and sometimes overlapping approaches and understandings of these theories. In other words, the theories presented here reflect different facets of the vertical coordination and can be thought of as complementary.

2.2.1. Theory of Life Cycle

Stigler's life-cycle theory of vertical integration was based on Adam Smith's theorem: "the division of labor is limited by the extent of market." Life-cycle theory shows that an industry is more vertically integrated in its early stage of development. When the industry is small, it does not pay for a firm to specialize in an activity that yield increasing return to scale. As the industry grows, some existing or incoming firms may specialize in one of the processes. That is, as the industry expands, it becomes profitable for a firm to specialize. Thus, in this second stage, a disintegration occurs. During the third stage, as the markets shrinks, firms tend to reintegrate and undertake more processes than in the first stage. Stigler's life cycle approach has been criticized but also extended to explain the evolution of agricultural industries (Berkama and Drabenstott 1995; Gillespie et

al. 1997).

2.2.2. Transaction Cost and Principal-Agent Theory

The history of transaction cost economics starts with Coase's famous article in 1937 explaining why firm exists (Coase 1988). Coase argued the existence of costs of using the price mechanism. These costs later termed transaction costs, included the costs of writing, executing, and enforcing contracts. Firms are established to minimize these transaction costs of exchange. If it is more expensive for a firm to acquire an input in the market place than to produce it itself, the firm will vertically integrate into production of the input. After Coase's study, the literature on transaction cost approach to vertical coordination did not substantially develop until the late 1970s (Barry et al. 1992). Williamson expanded Coase's idea of transaction cost including behavioral assumptions of opportunity² and bounded rationality³ of economic agents. This theory is based on the idea that "institutions of economic organization have a transaction cost origin" (Williamson 1973).

Williamson considered the main purpose of vertical integration to be economizing of transaction costs. He identified two types of transaction costs; Ex-ante and ex-post. Ex ante costs include the cost of drafting, negotiating, and safeguarding an agreement. Ex- post costs are those costs incurred when agreements become a source of disputes.

In each case these costs may include the cost of acquiring and processing information, legal costs, organization costs and costs of inefficient pricing and production behavior (Joskow 1990). The concept of transaction cost and principal-agent theory as conceived by Coase and expanded by Williamson and others indicates that the form of vertical linkages or coordination in an economic system depends not only on economies of size and scope as suggested by conventional theory but also on costs incurred in completing transactions using various coordination mechanisms.

Furthermore, these costs and the performance of various coordination mechanism depend in part on the incentives and relationship between transacting parties in the system, the principal and the agent. Under various conditions, the principle and/or agent may exhibit

² Opportunism is the wayward tendencies of supplier to mislead, cheat and generally underperform. An integrated firm minimizes these hazards by owning and directly controlling its own suppliers.

³ Bounded rationality is the limits of reducing transaction costs. By owning and directly controlling their own operations, an integrator firm can avoid the cost of searching for the best and the cheapest suppliers.

shirking behavior or moral hazard behavior⁴ (Boehlje and Schrader 1998).

Transaction costs can be separated into two categories: coordination and motivation costs (Milgrom and Roberts 1992).

i. Coordinating costs are the costs of monitoring the environment, planning and bargaining to decide what needs to be done (pre-contractual costs; ex-ante).

ii. Motivation costs are the cost of measuring performance, providing incentives, and enforcing agreements to ensure that people follow instructions, honor commitments, and keep agreements (post-contractual costs; ex-post)

In transaction cost theory, each type of vertical governance structure will stem from the characteristic of transactions. Under the assumption of economic efficiency and competition, the chosen governance structure will minimize total transaction costs (Sauvee 1998).

Agency theory deals with the relationship between two parties. In an agency relationship, the agent (e.g., the farmer) is expected to behave in accordance with the goals of the principles (e.g., lenders, wholesalers, processors).

The theory focuses on the contract between these two parties and seeks to determine the optimal contract, i.e., the contract with the most efficient organization of information and the lowest cost.

Agency theory suggests two main strategies of control, behavior based and outcome based (Eisenhardt 1985). When the behavior of the agent is observed, a behavior-based contract is optimal. In the case of complete information the agent is aware of his/her behavior, but the principal is not. In the case of incomplete information, if the agent is rewarded based upon his/her behavior, the agent may shirk. In both these cases, the principal has two options; either the principle can purchase information about the behavior of the agent and rewards good behavior or the principal can reward the agent based on outcomes. The optimal choice occurs between the two alternatives based on the trade-off between the cost of measuring behavior and the cost of measuring outcomes and transferring risk to the agent (Eisenhardt 1985).

In an agency relationship, because of the different reasons such as information asymmetries, it is impossible to write a complete and comprehensive contract to cover all possible future events. Therefore, contracts generally are incomplete and the objectives and

activities of the principal and agent will not completely coincide (Barry et al. 1992).

The set of institutional arrangements within a transaction is called a **governance structure**. Mohaney (1992) recognizes a continuum of governance structures including spot markets, short term contracts, franchising, joint ventures, and vertical financial ownership. Mohaney suggests that the form of coordination or business linkages will be a function of three characteristics of the transactions and the industry :

i. Asset specificity refers to the specialized nature of the human or physical assets that are required to complete the transaction. The more idiosyncratic the asset, the stronger the linkage or bound required for the transacting parties to invest in that asset.

ii. Task programmability: Indicates that a transaction is well understood by all parties and often repeated, thus not requiring intense discussions or negotiations and easily accomplished by impersonal coordination mechanisms.

iii. Task separability: Refers to the ability to determine and measure the value of the contribution and thus the reward that should be given to each participant in the transaction. If it can be accomplished easily (and thus transaction is separable), coordination systems that are less personal are relatively more efficient and effective than separability does not exist.

Transactions have been classified in terms of frequency, uncertainty, and asset specificity⁵. The transaction cost approach provide insight into the key role of asset specificity but neglects the interactive effect of the measurement problems that have been highlighted by the agency theory.

On the other hand, positive agency theory emphasizes measurement costs but neglects asset specificity (Mahoney 1992). The integration of the transaction costs and agency approaches yields five determinants of organizational form: task programmability, task separability, demand uncertainty,

⁵ Williamson (1989, p.143) identifies four different types of transaction specific investment; **i. Site specificity**: Buyer and seller are in a relation with one another, reflecting ex ante decisions to minimize inventory and transportation expense. **ii. Physical asset specificity**: When one or both parties make investments in equipment and machinery that involves design characteristic specific to the transaction and which have lower values in alternative uses. **iii. Human-capital specificity**: Arising as a consequence of learning-by doing, investment and transfer skills (specific human capital). **iv. Dedicated assets**: General investments that would not take place but for the prospects of selling a significant amount of products to a particular customer. If the contract is terminated, it would leave the supplier with significant excess capacity.

⁴ The possibility of self-interested misbehavior before and/or after agreement (pre- and/or post negotiation).

technological uncertainty and asset specificity. Mahoney (1992) presented an organizational form prediction considering the interactive effects of the task programmability, task separability and transaction cost of asset specificity (Table 2.1).

Despite the general acceptance, transaction cost economics is also heavily criticized. The importance of transaction costs seems to be over emphasized. Indeed, transaction costs are important but they are not everything (Boon 1999). In short, vertical integration is a form of governance structure and can lead to lower transaction costs.

McFetridge (1994) suggested another theory called imperfect competition or neoclassical approach as a complementary approach to the transaction costs theory. The imperfect competition approach to vertical integration is concerned with the opportunities for vertical exchange that arise as a consequence of imperfect competition at one or more stages of production.

He argued that, theoretically, imperfect competition at one or more stages of production makes either vertical restraints or vertical integration profitable. "One well known example is the successive monopoly or successive marginalization problem. The replacement of successive monopolies by a vertically integrated monopoly is both profitable and welfare increasing" (McFetridge 1994).

2.2.3. Strategic Management.

This concept is derived from Porter's value chain strategies to develop a strategic competitive advantage and the criteria or considerations in the integration (buy-versus-build) decision. According to Porter, the basic unit of competitive advantage is the discrete activities. The firm is a collection of discrete but interrelated activities and firm's strategy defines how they are interrelated. Hence, competitive advantage will result "from a firm's ability to perform the required activities at a collectively lower cost than rivals." The central interest of Porter's approach is that vertical coordination is a result of a firm's behavior. Boone and Verbeke (1991), in their analysis used a "strategic management of contractual relations" concept wherein the benefit is normally associated with a hierarchical organization. For them, vertical coordination can be explained in terms of transaction costs (Sauvee 1998).

Harrigan (1986) explained the dimensions of vertical integration as degree, stage, breadth, and form and tried to measure them. She took a classical strategic management perspective on vertical integration and outlined four main factors that determine the choice of vertical integration. These factors are demand and

infrastructure uncertainties, market stability, bargaining power and corporate strategy requirements (Harrigan 1986).

A transaction can be organized within the firm or through the market, but organizing a transaction within the firm does not eliminate contracting costs, since by doing so one replaces a contract for intermediate input with employment contracts. Choosing the appropriate mix of contracts and improving the efficiency of each type is a source of competitive advantage (Hernart 1994). In other words, competitive advantage arises from inter-firm differences in their organization capacities and also taking into consideration bureaucratic costs and the incentive problem of hierarchy. Hennart (1994) extended the definition of transaction costs stating that while economizing on transaction costs, vertical integration may increase the bureaucratic costs. He argued that using an appropriate coordination strategy is important within the firm and on the market.

Zajac and Olsen (1993) have indicated that the standard transaction cost theory is a one-sided analysis of cost minimization and neglects the interdependence between partners. They attempted to provide a new perspective on transaction cost analysis by offering a transactional analysis framework based on joint value maximization instead of a single-party analysis of cost minimization and by proposing a set of processual dimensions relevant to create and claim value by partners. They did not claim that transaction costs do not exist or are irrelevant to the study of inter-organizational strategies. According to Zajac and Olsen, process/behavioral aspects of inter-organizational must be considered (Zajac and Olsen 1993).

From the strategic management point of view, the incomplete character of transaction cost analysis leads to overestimation of advantages of vertical integration. Both market transactions and vertical integration are inefficient. Therefore, the main challenge of the firm is to develop strategic management of the contractual arrangement.

2.2.4. Negotiating Power and Performance Incentives.

Another set of arguments that may help explain the choice and implementation of various coordination mechanisms relates to the concept of negotiation power and performance incentives. In negotiated coordination among stages in the food chain, the invisible hand of the market is replaced by the very visible hands of buyers and sellers negotiating the terms of trade in many cases prior to the production or manufacturing process. In such a system, phenomena such as negotiating strategy, skill, power, conflict resolution, trust, performance monitoring, and evaluation become central in the

system. Recent work on various approaches to provide performance incentives, as proposed by Casson, may also be useful (Boehlje and Schrader 1998). The basic presumption of the Casson's work is that the overall economic performance of any system depends on transaction costs which mainly reflect the level of trust that exists in the economy. The level of trust in turn depends upon culture. A key concept in this argument is that of trust. A crucial question in any economic transaction, and particularly in those that personnel and negotiated, is whether either party in the transaction can be trusted. There are two fundamental approaches to creating trust;

- i. Use of the legal system and penalize those parties that do not fulfill their negotiated commitments.
- ii. Manipulating an intensive structure that individuals fulfill their commitments based on rewards they receive rather than penalties they incur.

The impossibility of writing a complete contract and asset specificity associated with modern agricultural production strengthen the role of trust in contract coordination. In a continuing game even the large contractor who is recognized as being in control must maintain a reputation for fairness. The contractor needs a group of contractees as much as the contractees need the contractor.

Another interesting approach to vertical coordination is Sporer's interpretation of **strategic alliances** based on collaboration and the trust as the key features. Sporer (1994), in his definition of strategic alliances, excludes merger and acquisition and other corporate partnering, and includes only informal vertical arrangement. In this type of coordination, parties to the alliance are stakeholders in the object of cooperation but they are not shareholders. The arrangement is self-enforcing i.e. in the event of breach of contract, the arrangement is simply terminated, third party involvement is not anticipated. The length of this type of alliance is long-term compared to other classical one-season or one-year contracts.

2.2.5. The Capabilities Approach

Knowledge-based capabilities was used first by Richardson linking capabilities with the pattern of economic organization. He suggested that in an industry there are an indefinitely large number of activities. These activities have to be carried out by organizations with appropriate capabilities i.e. with appropriate knowledge, experience and skills (Richardson 1972). He discussed that, coordination among the firms could be accomplished by consolidation, co-operation and market transaction. The appropriate way of coordination depend on the degree of similarity, complementarity between or

among activities.

In the capabilities view, knowledge has a central explanatory role for understanding economic organization. Contrary to neoclassical theory, the capabilities approach assumes that knowledge about production is neither explicit or freely transferable. Under full information and no uncertainty, every organization is as efficient as any other. However, much of the knowledge is tacit and hard to formalize and communicate and can be acquired only through learning processes (Boon 1999). Each firm processes capabilities differently than other firms and thus, will not incur the same production costs even though they perform the same type of productive activity (Foss 1996). **Asymmetries in knowledge: i.e. differential capabilities** result in performance differences between firms. Knowledge could be transferred through the market mechanism or through firm organization. Transfer of tacit knowledge is impossible, only codified knowledge or explicit knowledge in products can be transferred across markets. Economic agents may have substantial differences in initial productive knowledge for their joint productivity. In that sense, frictions can occur between economic agents. These frictions are also called knowledge based transaction costs (Connor and Prahalad 1996). Integration into many stages would be costly because other economic agents with superior capabilities would have a relative production cost advantage. Hence, firms must rely on market transactions or cooperation between firms, even when transaction cost economics would suggest otherwise. Boon (1999) discussed what determines the choice of organizational structure in the food system and why the food system is more tightly integrated. He explained the capabilities approach using an example in livestock raising and argued that farrowing, nursery, and finishing are integrated within the farm firm while slaughtering, carcass cutting, and processing are integrated in slaughterhouses. However, farm activities are not similar to slaughterhouse activities in that they draw on very different capabilities. Transactions between farms and slaughterhouses were often market transactions, but contracting has become more dominant in the animal production sector. Slaughterhouses produce increasingly different products with specific quality characteristics included branded products instead of generic. In order to establish this production, slaughterhouses need to developed and transfer the necessary knowledge to the supplier. This knowledge may be tacit and hence difficult to be acquired by the farmers. Contracts that specify particular quality characteristics or even the specification of production techniques may be an attempt to codify this knowledge in order to create new

value in the production process. For example, pig farming has usually been integrated within one farm, but farmers are increasingly specializing in only farrowing, nursery or finishing. Boon (1999) concluded that differential capabilities give them a production cost advantage which may outweigh transaction cost (Boon 1999).

2.2.6. Convention Theory and Contract Economics.

These are the recent theoretical developments relevant for the study of vertical coordination.

Prices do not constitute a determining variable to ensure coordination but one of the links of organization subject to conventional rule. When open market works properly, quality will be assessed by a given price. But quality conventions are necessary when the price alone can not evaluate quality. Eymard-Duvernay distinguishes four generic forms of coordination (Sauvee 1999). **Domestic coordination** occurs when uncertainty about quality is solved through trust. In **industrial coordination**, quality is defined by a third party, outside the market, who determines the common norm and standards. If prices are sufficient indicators to evaluate quality, i.e. if there is no uncertainty about quality, then the market works by itself which is called **market coordination**. **Civic coordination** occurs when there is a collective commitment to avoid conflicts. In this theory, a set of mechanisms and rules that involve private agents as well as public institution exist. The content of product specification, nature and roles of third parties involved, strategy of product differentiation or labeling, or other empirical observations about quality clarify the convention. Influenced by strategic management approaches, convention theorist insist that coordination mechanisms determine the degree of cooperation or competition between agents. Moreover, the convention theory approach shows that the definition of contracts cannot be understood exclusively at the microeconomic level, i.e. between two partners. A convention is also a mode of regulation found at a collective level, for instance a region or an industry. Unlike the neoclassic economist, convention theorists do not consider non-price exchange between firms as market failure or imperfections. Instead, adopting a positive approach, they integrate the diversity and the complexity of the quality issue and build their analysis on it. In spite of methodological incompleteness, this approach usefully links quality questions with industrial structure. Convention theory has been used in the study of quality conventions found in agricultural sub-sectors. Valceschini demonstrates that in the French vegetable processing industry, the traditional articulation between civic and industrial coordination where price discovery

and definition of quality are centralized is no longer relevant. In this sector, product contracts between vegetable producers and processors have been established at a collective level in a national inter-professional organization (Valceschini 1995). Sylvander (1995) demonstrates that in the French poultry processing industry, quality specifications influence the choice of coordination mechanisms and consequently, the firms compete and cooperate. This is the emergence and the strengthening of an industrial convention that determines the economic behavior of the firms. In this industrial convention, quality is defined and controlled by the third party. Each grower is held to a strict set of standards and requirements about feed, genetic stocks, housing conditions, etc. Based on the convention theory assumptions, Valceschini's and Sylvander's approaches have three methodological steps for the study of vertical coordination.

i. The comprehensiveness of the contract's formation can not be understood exclusively at the microeconomic level. Indeed the content of the contractual arrangements (micro level) may stem from institutional arrangements and institutional organizations (macro level).

ii. These institutional arrangements greatly contribute to the shape of the competition in the sector. Contract are not outside the competitive process but are a part of it.

iii. The formation of these arrangements is itself dependant upon external and internal factors. Therefore, a complete vertical coordination analysis should include the study of interplay between basic conditions and strategic behaviors and the effect of their consequences on the institutional environment (Sauvee 1998).

Brousseau's (1993) **contract economics** extends the Williamsonian paradigm but reconsiders some of his fundamental assumptions. He proposes a general theory of bilateral economic relations and combines transaction cost theory and elements of industrial organization. Although strongly influenced by Williamson, Brousseau differs from him on several important matters. His definition of costs is more extensive adding two more cost categories to the transaction costs: production and incentive costs. These three categories of costs are the basic elements for the evaluation of contract efficiency. He focuses on the comprehension of the decision process instead of defining a determinist model of governance structure. For him a redefined notion of contracts replaces the governance structure (Sauvee 1998).

2.2.7. Value Differentiation and Complementarities.

Goodhau and Rauser tried to explain recent organizational changes in the food system by using the

theory of complementarities. They have defined recent changes in the agro-food system as value differentiation instead of industrialization (Goodhau and Rausser 1999). Value differentiation describes the process by which increasing the value added to agricultural products by differentiating them to meet consumer requirements. The theory of complementarities in activities was first written by Milgrom and Roberts (1992). Essentially, the theory of complementarities formalizes the notion of positive feedback effects among a firm's production, organization and management choices. A shift in an exogenous system parameter will have direct effects on the firm's activity choices, reinforced by the feedback effects across activities. Biotechnology, information technology, and changes in consumer preferences which are commonly viewed as the driving forces of value differentiation are not induced by actions of the actors of agro-food chain but rather are due to changes in the lifestyles, incomes, and demographics. The value of differentiation process is driven by complementarities across activities so that a jump in one variable, such as a biotechnology-induced change in the production, will change the marginal value of other activities. This structure aids firms in identifying desired products and delivering these products to consumer at the lowest cost.

2.3. Contract Farming

2.3.1. The Concept of Contract Farming

These sort of vertically coordinated production relations are not new. Contracts were employed by the Japanese colonial state for sugar production in Taiwan in the period after 1885 and by the USA banana companies in central America in the early part of the twentieth century (Watts 1994). By the late twentieth century, however, in the Western Europe⁶, North America and Japan, contract farming became an integral part of food and fiber industry. In advanced capitalist states, it seems that contract farming was widely used by the vegetable canning industry in North America and by the seed industry in the Western Europe in the 1930s and 1940s.

Contracts in a general and incomplete sense are found in agriculture everywhere in extremely heterogeneous forms. Simple market specification contracts or future purchase agreements (typically determine price, quantity, and time of delivery) are common and labor contracting, supplying labor and machinery as well as share-cropping contracts have a wide application in agriculture (Wright 1989; Eswaran and Kotwal 1985).

Contract farming or contract production, however,

must be distinguished from the multiplicity of simple marketing or share-cropping and labor contracts. Specifically, contract farming entails relations between growers and private or state enterprises, that substitute for spot market transactions between family farms and a processing, export or purchasing unit. A standard farming contract includes provisions for price, production practices, product quality, and credit facilities, etc.

Arriving at a meaningful definition of contract farming is rather difficult. The one classic definition provided by Roy refers to contractual arrangement between farmers and other firms, whether oral or written, specifying one or more conditions of production and/or marketing of an agricultural product (Roy 1963). Roy's definition is perhaps too broad since it would include forward contract in which only price and volume are set. Whether a forward contract can be bought and sold is not our interest here. In the definition above, even after excluding marketing arrangements such as forward contracts, two conditions must be added.

First, contracts should be non-transferable, and second, the terms "and/or" should be replaced by "and". Contracts must specify one or more conditions of production and marketing (Glover 1984).

Contract farming has been promoted over the past 30 years as an institutional innovation to improve agricultural performance in less developed countries sometimes as a key element of rural development and/or settlement projects (Ghee and Dorall 1992).

This system was accepted and used as one of the promising institutional frameworks for the delivery of price incentives, technology, and other agricultural inputs. Local governments, private firms, multinational companies, international aid and lending agencies like U.S. Agency for International Development, The World Bank, Asian Development Bank, and Commonwealth Development Corporation have been involved in these contract farming arrangements (Glover 1994). However, world-wide applications in practice has caused to appear different terms and connotations regarding contract farming in related literature (Glover 1992). Hence, **contract farming** is used only for a private sector scheme, while other terms are used for different applications as follows.

Outgrower Scheme: Generally connotes a government scheme. In this system government usually has a public enterprise purchasing produce from farmers on its own or as a part of joint venture with a private firm. This term is frequently used in Africa and Asia.

Nucleus-Outgrower Scheme: It is a variation of the outgrower scheme in which there is a project authority which has or administers a plantation adjacent to the processing plant. This plant supplements its own

⁶ Earliest record of forward purchase agreement is dated 1878 (Barker 1972).

plantation production by contracting in different proportions. **Satellite farming** is used to refer to any of the variations of the schemes mentioned above. On the other hand, the term of **multipartite arrangement** is used to emphasize the scheme in which several actors such as private firms, government, and foreign aid agencies are involved.

Several types of contracts are distinguished according to the number of decisions influenced, sharing of the risks, and specifying contract terms. From the production decisions or management point of view, two types of contracts are determined.

i. Limited Management Contracts: In this type, the farmer signs a contract to obtain some production inputs. There is no real guarantee for price. The farmer's responsibility is limited only for the production inputs which he has obtained under agreement.

ii. Full Management Contracts: In this case the farmer and the integrator firm have made a contract based on a certain amount of production. In this type of contract the farmer has to follow some provisions specified in the agreement. Here, the producer provides a certain market for his product and insures himself against risks.

Kohls and Uhl (1985) has classified contracts into three broad categories.

i. Market specification contracts: Specify product quality measures which will be acceptable to the integrator and restrictions placed regarding the price and the method of payment. Contracts are generally signed at planting time and specify how much the integrator will buy and at what price. Little or none of the farmer's management decisions are transferred. From the producer viewpoint, they guarantee a buyer if the specifications are met.

ii. Resource providing contracts: In this type, the integrators provide production resources with certain conditions, managerial help, and supervision. Product prices are usually based upon the spot markets and income guarantees to the producers are minimal.

iii. Management and income guaranteeing contracts: These types of contracts often include the production and marketing stipulations of the former two types. In addition, market and price risks are transferred from farmers to integrators. On the other hand the integrator takes a substantial part of the managerial responsibility of the farmers.

Another contract classification identified by Williamson (1979) based on the transaction economies. These are, classical, neoclassical and relational contracting. According to Williamson (1979) three characteristics of transactions are important in the determination of the contractual relationship,

uncertainty, frequency of transactions, and the degree to which investments are idiosyncratic. He described different governance structures regarding the characteristics of transactions, excluding uncertainty, as shown in Table 2.2.

Classical Contracting (Market Governance): Market governance is the main governance structure for nonspecific investment characteristic of both occasional and recurrent transactions. This type of contract is rather definitive. They are complete and might be traded on the exchange. In these contracts, third party participation is discouraged. The emphasis is on legal rules, formal documents, and self liquidating. Contracts for delivery of a specific quantity at a specific price, time and place are considered a part of market consideration (Schrader 1986).

Relational Contracting (Transaction-specific Governance): This type of structure is used for recurring, mixed, and highly idiosyncratic transactions of. In this relational contraction, two main types of governance structure can be observed. **Bilateral structure (obligational contracting)** refers to autonomy of the parties.

Vertical integration refers to the unified structures where the transactions are removed from the market and organized within the firm subject to an authority relation. When the contractors guarantee is needed to finance producers facility, production is controlled by the contractors and the contract is long-term, there would be significant differences between contracting and integration.

In the bilateral structure, mixed and idiosyncratic characters of investment required for production are extensively specialized so there are no obvious scale economies to be realized through inter-firm trading that the contractor or contractee is enable to realize himself through vertical integration.

Under uncertainty, of course the degree of uncertainty would affect the degree of integration depending on the asset specificity and frequency of transaction.

2.3.2. Reasons for Contract Farming and Disadvantages.

The main reasons behind contract farming could be summarized as follows:

From the transaction cost framework, the neoclassic focus on market imperfections is limited because it ignores the cost of exchanges, i.e. transaction costs. The main reason for the vertical integration is to decrease these transaction costs. The degree of integration mainly depends on the frequency, asset specificity, and uncertainty regarding transactions. Asset specificity encourages internal coordination. Large investment in

specialized assets increase the potential loss under unexpected market outcomes. Thus, uncertainty (price, quantity, quality and time) is an important factor favoring internal coordination along with the availability of asset specificity.

Market imperfection that may produce incentives for vertical integration include imperfect competition in addition to imperfections caused by externalities and imperfect or asymmetric information (Rogers 1998).

Uncertainty and reducing risk have significant coordination implications. One of the main risks is that of prices of inputs and outputs. Coordination through contracting or integration will reduce price risk to some extent. A second source of risk is related to quantity and quality features. In an open market structure, it is almost impossible to provide the required quantity of commodity in a certain quality. A third source of risk is food safety issues that can be analyzed into two dimensions. The risks for human life and for environment pollution. Both require rather personal and coordinated market relationships.

Another main important force behind the integration and contract farming is the changes in the market structure. Well-trained buyers in the market and the necessity to supply produce with a certain quality and quantity over time are the main reasons. Consumers have become more discriminating food buyers. Increased demand of prepared food and concerns about nutrition and food safety are the important determinants for strengthening vertical coordination (Berkama and Drabenstoll 1995). Delivering food products with improved safety characteristics requires coordination among producers, first handlers, processors, and retailers (Caswell et al. 1994). The primary motivation for such arrangements is to obtain greater control over the physical characteristics and quantities of commodities exchanged (Buccola and French 1981).

It is a fact that production technologies have been improving very rapidly. Market failure in conveying information about quality is one of the motives for increased vertical coordination (Hennessy, 1996). Contract farming is seen as a sound way to push innovation of new technologies and provide more efficient production.

The establishment of a new processing plant requires large investment resulting in high fixed costs. An uneven supply of raw material greatly increases unit costs. Therefore these firms have an interest in keeping raw material inflows at a steady level close to plant capacity (Roy 1963; Harryman 1994). Relying on open market purchases is unlikely achieve this steady raw material flow.

Contract farming is also thought of as a way of

commercialization and industrialization in agriculture especially for the developing and less developed countries. Contract farming will help small family farms and farm laborers who need capital and managerial assistance (Moore 1994). The majority of the farms are small and subsistence. In nature, it is commonly recognized that small family farms are potentially an important source of growth in agricultural production and small scaled agriculture has some socio-economic advantages (Rehber 1996). But there are serious constraints on small farm production related to problems of access to production inputs, services, and information. Small farmers often lack the necessary production and marketing information pertaining to new crops and varieties. Even with sufficient information, they do not have the financial resources necessary and access to credit facilities are limited mainly because of the lack of collateral. Contract farming is an example of such a mechanism that deals with many of these constraints in an integrated manner (Roy 1963 ; Doye et al. 1992). Government intervention and subsidization policy could be seen as an alternative to contract farming. Public interventions and support policies are ineffective especially in the developing countries and they do not help to remove the obstacles mentioned above. Government efforts to subsidize are mostly in favor of large farmers. "The New World Order" of global restructuring of the food industry symbolized by the GATT and newly established WTO which are mainly aiming at lessening or cutting agricultural subsidies must be considered here.

One of the main reasons for the integrators may be to avoid government restrictions (Shepperd 1990). Internal transfer of intermediate input and flexibility of adjusting production cost through internalization can be used as a way reducing tax. Internal exchange is a means of avoiding control when the intermediate input is subject to price controls.

Beside the reasons mentioned above, recent sophisticated ideas such as environmentally sound, sustainable and economically viable agriculture and standards and regulation related to both environment and health safety are the main initiatives behind the fast growing use of vertical coordination and contractual arrangements in agriculture (Boehlje et al.1995)

Although the reasons for change from open production and market exchange to all types of vertical relationships are essentially similar, some inherent characteristics of agricultural production and marketing dominate contractual relationships in agriculture. Despite the changes toward a market oriented structure, the rapid decline in numbers and growth in sizes especially in the developed western world, historically

large number of individual farm units and spatial dimension of the agriculture which consists of scattered firms structure over a large area have been the major factors for the dominance of long and short-term production contracts (Olson 1985).

Other main distinctive characteristics of agricultural products and markets could be identified as follows:

- Agricultural products are often bulky and/or perishable, causing shipping cost to be high, restricting mobility and limiting access to only those buyers located close to the production site,
- Processors need highly specialized agricultural products and other inputs can not normally be substituted for a given agricultural product.
- Farmers are specialized to the supply of particular commodities through extensive investment in sunk assets. This represents exit barriers for farmers and cause the raw product supply to be inelastic (Rogers and Sexton ,1994 p. 1143)

Along with a variety of related problems such as delays in delivery or payment, quality deterioration, etc., contract farming generally also has some disadvantages or problems as a production system. One of the economic factors favoring the increasing use of production contracts is the need to realize efficiencies through risk management, but contract farming creates its own risk, as well as reducing other risks. For the producer, the failure of producing to contract standards will result in loss of the contract's premium prices. Other risks include the non-renewal or termination of contracts, perhaps for non-economic reasons. On the processor side, the main risks are the failure to have a constant supply, or losing timely receipt of desired quality and quantity of product, loss of technological advantage, and liability to the producers or third parties (Kelley 1994).

The farmer loses his independence to some extent contingent on contract conditions. That means the farmer's management function is transferred to another person. It is arguable that, a skilled farmer get worse under a contract than if he takes his chance in an open market.

It is a fact that contracting is a negotiation between unequal, economically powerful agro-business and rather weaker farmers. But farmers can cooperate to gain bargaining power to ensure fair contract terms.

Finally, if the integrator has gained a monopsony position, he could abuse his position to violate contract provisions in his favor. That means when alternative marketing opportunities are closed out and an overly integrated firm or sector may beat down the terms of the contract. Of course this is not a desirable consequence for improving agricultural marketing.

2.3.4. Content of Contract

A fair contract should contain reciprocal obligations with a balance between the rewards and the risks accruing to each party. A production contract should at least contain the provisions presented below:

- Define the parties.
- Specify type and the quality of the produce.
- State the quantity of the produce.
- State clearly the responsibilities of both parties concerning production and marketing practices.
- Indicate the manner, including timing , of delivery or collection.
- Determine the price (specific or formula) or other consideration and indicate the effects of variations in quality, quantity or manner of delivery and also specify the manner and timing of payment. Price is frequently left variable in contracts. Fixed or negotiated prices are more frequently used in one to three year contracts. If the majority of transactions in a commodity are priced through such negotiations, the fixed price becomes the market price. Sometimes contract prices are established by a scale or formula that relates the contract price to various economic indicators (Buccola and French 1981).
- Indicate the duration of the contract and the way in which it may be terminated and/or renewed. Contracts for processing vegetables and field crops are mostly signed on an annual basis. Fruit contracts tend to span more than one year (Buccola 1980).
- Appoint an arbitrator or indicate how disputes are to be resolved.
- Signature clause.

3. General Structure of Food Industry and Contract Farming in Turkey and in the USA

3.1. General Structure of Food Industry and Contract Farming in Turkey

3.1.1. General Overview

Since the foundation of Turkish Republic in 1923 Turkey has been a country in transition from an agricultural economy to an industrial economy. Although considerable progress has been achieved, fundamental problems still exist in agriculture and in the food sector when compared to developed countries. The share of agriculture in national income and export value have been decreasing and were 13.37%⁷ and 11.45% respectively in 1996 (Anonymous 1998). Shares of rural population and active labor force employed in agriculture were about 35% and 45% respectively in

⁷ Forestry, fishery, and food industries were not included.

1995 (Anonymous, 1995). One of the main obstacles of the Turkish Agriculture, and of course general development efforts, is the rather high ratio of population engaged in agriculture that live in rural areas. Turkey has 779,000 sq. km total area, one-twelfth that of the U.S. There are approximately 4 million farms, increasing from 3.1 million in 1960. The farm structure in Turkey is very fragmented. In 1991, 66.9% of farm households were cultivating an area smaller than 5 ha. More than 95% of all farms and over 60% of the total land fell into the less than 20 ha farm size group. There are about 37 State Farms which have an average of more than 1000 ha. Most of these operate under the control of Ministry of Agriculture (General Directorate of State Farms). Although subject to privatization in the recent two decades, they played an important role in the early development stage of Turkish agriculture through introduction of high-yield seeds, new production techniques, and application of contract farming.

Development of the Turkish food industry as in the other sectors, was initiated with the foundation of the Republic. The first sugar factory was established in 1926 (Herslag 1958). Considerable progress has been achieved through five-year plans and annual programs which began in 1963.

This progress accelerated in the 1970s, with market-oriented policies instead of inward-looking strategies. Turkey embarked upon rather comprehensive liberalization and structural adjustment programs especially after 1980 (Uygur 1995).

Despite several incentives devoted to the sector in the five-year development plans since 1960, food industry has not reached the desired level in Turkey. Although it is difficult to find reliable data, it could be said that the share of food supplied through processing 10-20%, as compared to 60% in the developed world. Growth rates ranging between 4% and 7% were achieved during the planned period. There are rather serious problems concerning the development of the food industry. The most important, as defined by the industry, is raw material procurement problem and vertical co-ordination between farmers and industry.

There were 25,368 firms in the food industry according to the 1990 Industry Census of Turkey up from 22, 300 in 1988. Only 500 of them were higher capacity factories which have modern technologies. About 2,000 were lower capacity plants, the remainders were small size units with undeveloped technologies (Anonymous, 1993). Breakdown of firms by the number of the employees is presented in Table 3.1. Of the total 25,368 firms, 53% were grain mills and bakeries. Dairy and dairy products and fruit-vegetable processing plants were the second and third having 17% and 16%

respectively.

The food industry share of the total employment in manufacturing industry was 15% while 13% of total value added of the manufacturing industry belonged to the food-processing sector. The total established capacity of the food processing plants is more than sufficient to meet domestic and export demand, but some shortage still exists because of the low capacity utilization in the entire industry. It was estimated that only 31% of the total production capacity was utilized in 1990 (Cetin et al. 1996).

According to the 1996 data, the manufacturing industry share of total domestic GNP was 23.36%. Food processing had the highest share of the manufacturing sector income (Anonymous 1998). Total Turkish exports were 23.167 billion dollars in 1996, 9.75% of which has come from the food industry (2. 651 billion dollars). Food industry imports were 1.7 billion dollars, 4% of the total import value (Anonymous 1998).

Three different systems could be observed in marketing of agricultural products. Some are marketed in an organized system in which State Economic Enterprises and Cooperative organizations exist. Agricultural Sale Cooperatives have an important role in the price supporting system. Commodity Exchanges organized and controlled by law and regulations under the control of Ministry of Commerce may be included in this system. According to recent data, there are 98 Commodity Exchanges which are located in province centers and some large districts. These are not very effective (Doser and Rehber 1987).

Fresh fruit and vegetables are marketed in the wholesale market system under the control of municipalities. In this system, brokers and middleman have an important role while the first system outlined above is working in favor of producers.

The third group of agricultural products are marketed in totally free-market.

These explanations are made only to give a picture of the agricultural marketing structure of Turkey. It does not mean that each product is sold in one of these three systems. For example, if we consider milk marketing, 85% of the milk supply is handled and marketed in an unorganized manner by farmers, middlemen and approximately 2,800 small manufacturing plants. Only 15% of the total supply is handled by large capacity plants which have modern technology. The number of milk plants which have 1000 ton/year processing capacity was 1,308 in 1992, 91.5% belong to the private sector, 3.6% State Enterprises, and 4.9% cooperatives (Anonymous 1995). Consequently it can be said that most of agricultural products are handled in free-market conditions.

On a historical perspective, the Turkish food industry has a triple structure. On the one side, State Economic Enterprises (SEEs) had been established for processing sugar-beets, meat, fish, and milk. Some of these are subject to privatization and some plants have already been privatized in the past decade. SEEs in Turkey have taken a significant and a pioneer role in food industry from the beginning of the Republic. Especially the sugar industry since 1926 was not only the real pioneer in development of Turkish industry; it also was the initiator of contract farming. The Turkish Dairy Industry had an important share in processing of milk (some of them are privatized now). Most of sugar-beet production and marketing are under the control of the Turkish Sugar Factories Corporation. The Turkish Tea Company, the Meat and Fish Organization, the Turkish Fields Products Office and the State Monopolies Directories are some of the other important SEEs in the processing and marketing of related agricultural products.

The second type of organization in the Turkish food industry is cooperatives. The first agricultural sale cooperative was established in 1911 to process figs. According to the 1993 data, there were 433 Agricultural Sale Cooperatives (ASC), 13 ASC Unions and 732,514 member farmers. Some of the large foods processing plants still belong to these cooperative organizations. The estimated shares of the Sale Cooperatives are dairy, 2.93%; olive oil, 6.8%; vegetable oil, 9.7%; fruit juice, 5%; and flour, 1% (Mulayim 1995). Beside these sale cooperatives, Sugar-beet Producers Cooperatives, Tea Producers Cooperatives, and Village Development Cooperatives which have some food, processing and handling plants must be considered. Agricultural Sale Cooperatives have serious institutional, financial and managerial problems (Mulayim 1997). They are administered and controlled by the Ministry of Commerce instead of their members. They are mainly financed by State sources and have been acting as SEEs. Therefore, the term privatization is used incorrectly for these cooperative organizations (Rehber 1995). However, from the main cooperative principles' point of view announced by the International Cooperative Alliance, agricultural cooperatives in Turkey could not be accepted as real cooperatives except Village Development Cooperatives (Rehber 1993).

The third and most promising part of the food industry is the private sector. It is expected that the Turkish food industry will be developed in this structure in the future through relatively large private corporations which are viable in the changing and globalized market conditions of the world.

Turkish agricultural policy is outlined in five year

Development Plans. The principles of agricultural policy could be summarized as follows:

- Price support system.
- Agricultural extension services.
- Intervention to market both inputs and products through Public Organizations, Cooperatives and SEE.
- Custom and credit facilities.
- Extension of irrigation.

The price support system was initiated in the 1930s through intervention in wheat and grape markets by purchasing in the market in order to regulate price. By the end of 1970, the number of commodities in the price support system had reached to 30. The economic liberalization program embarked upon in early 1980s has caused this figure to fall to 10 in 1990 and to 9 in 1996 (Muthoo and Onul 1996).

Turkey has taken part in almost all political, economic and military movements of the West after World War II. Turkey also signed an association agreement with the EU in 1963. Despite its eligibility underlined on several occasions, Turkey is still waiting to be a full member of the EU despite the custom union agreement signed in 1996. Turkey is the first country to enter the Custom Union with the EU without being a full member. The Custom Union covers industrial and processed agricultural products while agricultural products remain out of its scope. Turkey should adjust her agricultural policy to adopt the Common Agricultural Policies.

3.1.2. Vertical Integration and Contract Farming in Turkey.

When we evaluate the structure of Turkish food industry from the point of view of vertical coordination, the relationships have been varied from spot market transactions, long established client relations to contractual arrangements. As observed in the investigated region, the spot market transaction was dominant in some sub-sectors while contract farming was the only way of vertical coordination in others.

National figures about the application of contract farming are not available. Beet sugar processing, and the commercialized part of broiler production operate under contractual relationships. In vegetable and fruit processing contract farming has been used widely along with the other procurement ways. In these chapter, broiler industry and beet sugar processing have been reviewed separately while vertical coordination and the structure of contractual relationship in other sub-sectors are presented based on a field survey conducted in the

Bursa region⁸. This region had 6.2% of total plants, 8.2% of established capacity, and 7.4% of total production of Turkish food industry in 1990 (Anonymous 1993). Although these figures reveal rather unimportant amounts, fruit and vegetable processing, vegetable oil, dairy and hop industry are well developed in this region. Hop production and processing exist only in Bilecik Province (Rehber 1998). Approximately 50-60% of the fruit and vegetable processing plants which have rather large capacities are located in this region. For example, 24 of the largest tomato paste plants of the 42 total are in this region. Bursa Province by itself has supplied more than 55% of the Turkish tomato paste production (Akgul and Rehber 1993).

No special legislative arrangement related to contract farming existed in Turkey until 1996. In June of 1996, the Ministry of Agriculture circulated a directive (regulation) in order to control contractual arrangements. Despite the general character of this direction, it was highly detailed even describing a certain pricing formula. This direction was immediately amended two years later in August of 1998, to outline a general framework compared to the detailed structure of the previous one. It was not more than a standard contract form giving the Directorates of the Ministry of Agriculture at the province and district levels the right to control and partake in the arbitration process as a third party.

3.1.2.1. Broiler Industry

The first attempt to establish a modern broiler industry as in the other sectors was initiated by Government through the foundation of a Central Poultry Research Center in 1930

Considerable progress was not be achieved until 1950. Around 1950, introduction of improved parent stocks contributed a real transition in the sector. Further progress could be realized after 1963 by using imported hybrid varieties from abroad. And a remarkable increase in exports at the beginning of 1980s has accelerated this process (Gunes et al. 1990).

Despite the rapid development observed during the last two decades, about 60% of the total broiler production is grown by independent growers who have no contractual coordination with processors. Therefore a considerable amount of broilers in Turkey are grown by traditional methods and are handled in an open market system in an unorganized manner. According to 1997 data, there were 6,785 broiler farms plus farms which

have poultry production as a side-activity. Of which, 72.6% have a capacity less than 5,000 head/per year.

The beginning of the vertically coordinated broiler production went back to 1969 with the Turkish Development Foundation (TKV) which was established to serve rural development. At the beginning, TKV started broiler production in a certain region by providing selective credit. Later, small size broiler growers were organized under regional Corporations which provide chicks, feed, services, processing and marketing. In 1985 these regional corporations were organized under a central Corporations (Holding) was known as KOYTUR. In recent years, the number of regional corporations has reached 11, the number of growers who have a contract relationship with these corporations is 2,220 with total 75,000,000 bird/year capacity, almost 20% of the total production capacity of Turkey (TKV, 1998). Beside KOYTUR, 20 corporations have controlled 90% of the industrialized part of broiler production through contractual arrangements with growers. Two types of vertical coordination could be observed. First, some are fully integrated. From growers to wholesalers, all activities from chick raising to processing are under control of the integrator in this system. A second system can be called partial integration. Either some of the production inputs (chicks or/and feed) or some services i.e. processing and feed preparation are provided from other companies outside the system.

Broiler contracts vary from integrator to integrator. Many broiler contracts are only one flock in duration. Both growers and processors have non-renewal rights. In general, the contracts have two common features. One of main features is the division of responsibility for providing inputs. The other important feature is the method used for grower compensation. The growers provide land, housing facilities, utilities (electricity and water), and labor. Operating expenses such as maintenance, repair, cleaning, and manure and dead bird disposal are also the responsibility of the farmer. The integrator provide chicks, feed, medication and advisory services. Typically, the processor company owns and operates hatcheries, feed mills and processing plant while providing transportation of feed and live birds. Other inputs such as fuel and litter are the responsibility of the producer. Most of the integrators require strict technical qualifications regarding construction and equipment of chicken houses.

Integrators can force changes in operation whenever they wish since there is no contract to prevent such changes. Broiler growers often complain that these changes are excessively expensive (For example new ventilation system) but they have no choice since they

⁸ Bursa, Balikesir, Bilecik and Canakkale Provinces were included.

have already had large sunk investments.

Although the calculation methods are changing from integrator to integrator, most broiler contracts have a similar remuneration schemes based on the performance evaluation. The performance payment is based on the feed conversion and mortality rates. A fixed price is determined and an adjustment made based on the grower's relative performance.

Standard mortality and feed conversion rates are determined differently from integrator to integrator. The standard feed conversion rate is calculated as an average of the growers performances who are in the production scheme. The standard mortality rate is determined arbitrarily based on technical assumptions, generally 5%.

Calculation of the amount paid to the growers is presented here as an example. The investigated firm has determined the standard feed conversion and mortality rates are 2.0 (f_s) and 5% (m_s). The grower has a 10,000 (c) head capacity, a 1.9 (f) of feed conversion rate and a 7% of (m) mortality rate. The fixed basic price per kg live weight is 88,000 (p_1) TL. 125,000 (p_2) TL is the amount considered for extra feed conversion rate above or below the standard, whereas 200 (p_3)/TL is the amount considered for extra 1% mortality rate above or below the standard.

The amount supplied by the growers;

$$S = c \times f (1-m) = 10,000 \times 1.9 (1-0.07) = 17,760 \text{ kg.}$$

Since the grower has a lower feed conversion rate ($(f_s-f) = (2.0-1.9) = 0.1$), he will get a bonus per kg equal to $(f_s-f) \times p_2 = 0.1 \times 125,000 = 12,500$ TL/kg. The 7% mortality rate is 2% ($(m_s-m) = (7-5) = 2$) more than the standard rate. Therefore he should get less as a penalty equal to $(m_s-m) \times p_3 = 2 \times 200 = 400$ TL/kg.

The price paid to this grower equal to $p = p_1 + (f_s-f) \times p_2 - (m_s-m) \times p_3$.

$$p = 88,000 + 12,500 - 400 = 100,100 \text{ TL/g.}$$

The total amount of payment;

$$T = S \times p = 17,670 \times 100,100 = 1,768,767,000 \text{ TL.}$$

The method of calculation is presented above can be formulized as follow;

$$T = S \times p$$

$$T = (c \times f (1-m)) \times (p_1 + (f_s-f) \times p_2 - (m_s-m) \times p_3)$$

3.1.2.2. Beet-sugar Processing

There were 25 beet sugar processing plants operating under the Sugar Factories Corporation. Four of them recently have been privatized. The Sugar-beet

Producers Cooperatives own these plants as one of the partners of the ownership before.

All sugar beet production has been under contract farming since the beginning of the industry. This production system is also important as the first implementation of contract farming. Sugar beet has been processed in stock companies, which are a kind of SEEs. There were, 407,350 farmers producing sugar beet under contractual relations with this organization in 1994.

There are also Sugar-beet Producers Cooperatives. The relationships between companies and producers was being organized by these cooperatives. Until 1994, the farmer who was in contractual relationship with a company had to be a member of the cooperative. Since 1994, this has not been required and the role of cooperatives is not as important. After the privatization period of 1980s contract provisions were being determined in favor of the farmers by the producers cooperative that had the ownership of some factories which were running as SEEs before (Anonymous 1994). It was argued that, this ownership integration through producers' cooperative has increased the financial efficiency in the privatized plant as in the U.S. (Koenig 1995). Indeed, in Turkey, there would not be any difference in farmers' income through the type of integrator because of sugar beet prices are subject to the government price support system and is determined by the government. The increased efficiency in the grower-owned factories could be achieved through efficient management, better-organized delivery and payment procedures.

In the sugar-beet production a simple pricing system is used based on the sugar content of the beet. Every year, the basic price which is based of 16% average sugar content has been announced by the Council of the Ministries. A premium is added or deducted according to the sugar content of the beet supplied. The premium is calculated by dividing the basic price by 16. The amount calculated for 1% sugar content is used as a premium, which is being used calculation the price paid to farmers. If the supplied beet has a sugar content more than 16%, the amount is added equal the amount of extra percent times premium. If the sugar content below 16%, same system is used vise-versa. In the price system, an extra premium is also paid for early harvest to regulate supply. The beet-sugar plants are classified into four groups according to the harvest period to determine the early harvest premium. That is, the early harvest premium varied from group to group. This premium is paid only if the beet has sugar content greater than or equal to 16%. Detailed information about the contract content and implementation are presented based on survey data in the last section of this chapter.

3.1.2.3. The Structure of Contract Farming in the Studied Region

In the studied region, contractual relationships have been widely observed, mainly in tomato paste, vegetable and fruit processing industries along with spot market transactions. Contractual arrangements account for 75% as an average especially in tomato and peas production. In dairy industry there was no straightforward contractual links between producer and dairies. About 60-70% of the raw milk was sold in open market, the remaining 30-40% was handled in some kind of open-auction system. In the open market, processors either have stable or mobile procurement centers or bought raw milk through brokers and other middlemen.

In the auction system, as widely used in Balıkesir Province, producers are organized under a cooperative or mostly under Village Service Unions which are semi-governmental organizations. These village service unions are having an active role in organizing these auctions in favor of farmers. The role of these organizations are similar to the bargaining cooperatives in USA (Marcus and Frederick 1994). However, there are some problems in practice.

It was observed that, in olive processing and vegetable oil industries, cooperative organizations, spot market transactions and long standing clients' relationship accounted more than those of contractual arrangements. "MARMARABIRLIK" (The Marmara Union of Olive Sale Cooperatives) in olive and "TRAKYABIRLIK" (The Edirne Union Oil Seeds Sale Cooperatives) in sunflower seed processing have significant shares and also have a regulation role in the table olive, olive oil and sunflower oil markets. In the region of study some olive producers are also members of the "TARIS (A Top Management of four Agricultural Sale Cooperatives)" which is located in Aegean Region. Marmarabirlik, which is a sale cooperatives union, has the biggest share in olive processing and marketing in the region with its 8 local cooperatives and 37,418 members. Trakyabirlik is also a very efficient nationwide union which has 48 local cooperatives and 138,806 members. This union's 1995 share of sunflower growth for oil production was 34.4% (Dayanikli 1995). However, these agricultural cooperatives have significant problems as mentioned before.

Hop production was included in the scope of this research because of its interesting features concerning producers and industry relationship. In the hop industry, private sector, a state enterprise and a farmer cooperative organization have been sharing the market. One private company tries to grow raw material in its own plantation along with contractual relationships with farmers as an

out-grower scheme (Glover 1987). Another private company and State Monopoly operate in the market only during harvesting season as buyers with an advance-paid price system. There is also a farmers' cooperative organization as a third alternative. In such a structure, despite the favorable offers, the private company could not succeed in increasing the number of the contractee farmers and also its market share over 60%. There is competition between farmers cooperatives and private companies. The role of the cooperative in marketing shows the importance of the farmers organization in contractual relationships and of obtaining bargaining power through that organizations (Koenig 1995; Ling and Liebrand 1995; Rehber 1996).

3.1.2.3.1. Contents of Contracts. Twenty five contracts have been examined from the region pertaining to this study. There were no special legislative base in Turkey until 1996 for production contracts which were prepared mainly on the basis of the contract sample of the Turkish Sugar Industry Stock Companies or of the personal preferences of the integrators.

There were some differences in the contents of the contract details often written in a language not easy to understood by farmers. They appear as provisions that the producers should obey arranged by the processors. Contracts generally compromise 4 main sections (Buccola 1980). In the first section, both parties are defined; in the second, the economic provisions of the contract and the responsibilities of both parties are presented. In the third section includes technical conditions and the last section includes the authority and method for resolving disputes and dissatisfactions. The end of a contract has a signature and authorization clause.

The length of the contracts found in our sample were mostly one year; the only exception was the hop production contracts which span more than one year. Eighty percent of the examined contracts are based on tonnage while 20% have an acreage basis. The contracts have been signed by an individual producer or by a producers group in which all producers are responsible reciprocally to each other. Each producer group has a representative or a responsible producer who has the right to change or add provisions to the contract and also acts as the representative of the processor. The share of this group approach is about 60% of the investigated contracts. Although the contract indicates both producer's and processor's responsibilities, the producer is also responsible for extra debt receipts, especially when he has received inputs or payment in advance from the integrators. While the share of payment in advance in contract implementations was 76%, the share of the contracts which have a debt receipts placed was about

60%.

The price and payment systems vary from contract to contract. The rate of the contracts in which the constant price approach has been used was 36%, whereas the constant price plus a premium system was used in 44% of the investigated contracts.

3.1.2.3.2. Contracts From the Producers' Point of View.

In the study region, interviews have been carried out with 75 contractee and 16 farmers who do not have contractual relations. Of these 65% have been producing field tomatoes. Contract farming was also widely used in the production of broccoli and green pepper. In the production of sugar beet and tobacco, contractual relationship is compulsory as in all of Turkey. Sixty two percent of the farmers who were interviewed, indicated guaranteed price and sale as the main reasons for signing a contract. Credit facilities and technical aids were indicated as secondary reasons. Producers generally interpret contracts as the only way of coordination, and are not necessarily being interested in what is written on the contracts. However, 54% of the producers who replied to questions about contract provisions, said they did not read the contract beforehand and merely signed it. Twenty percent of the producers who read the contract indicated they could not understand most of the language used. In practice, contracts are prepared by the processors and offered to the producers to sign who would like to produce under contract. Sixty percent of the farmers have expressed some problems concerning the contractors' responsibilities such as delay in payment, delivery, inadequate technical input aids, and information. Processors would like to spread delivery over a long period. This causes a backlog in front of the delivery points and very often quality deteriorates resulting in a loss of the quality premium.

Interviewed farmers have not been happy with the group approach to signing contracts. For example, in sugar beet production, each group consisted of 30 farmers. The first farmer in the list was the group leader and the second one was the second in command, they sign the contract for group members. The most important problem with this approach is that group members do not meet and do not feel responsible to each other. It is clear that there is no benefit with this group approach beyond being a sound guarantee for the processor. Attitudes of group leaders acting as representatives of the processors would not be an acceptable behavior for the other farmers in the group.

Almost all of the producers would like to have a contract which is authorized by a third party, preferably represented by the Farmers Union or Directorate of Agriculture or by the so called 'muhtar' (the elected head

of village).

Respondent farmers replied 95% positively to the question for organizing a bargaining cooperative as widely seen in the USA. Sixty five percent of them stated difficulties on establishing such an organization.

In the study region, 25 farmers, who are not involved in a contractual relationship were interviewed. Only 16 questionnaires were evaluated. Seventy three percent indicated they were familiar with contract farming, and 56% had contracts previously. Disputes related to price and method of payment were primary reasons for not continuing with contracts. As observed in the hop production, these dissatisfactions along with the availability of other marketing alternatives have caused an attitude against contract farming.

However, even the contractee farmers had a tendency for using other alternatives to decrease market risk.

3.1.2.3.3. Contracts From the Processors' Point of View.

It is a fact that the processors prepare contracts which means that they determine the conditions of the contracts. However, most of the interviewed processors have agreed that all contract provisions could not be realized. Consequently, contract production could not function as a way of providing raw material, which have quality and quantity requirements.

The contractor firms argued that, farmers are reluctant to use modern inputs and technologies which were generally advised by the field experts of the firms. According to the processors, the most significant problem has been purchasing the commodities and payment. Except for the sugar beet price which is subject to government intervention, all product prices are affected by the price in the open market regardless of the price in contracts. When the spot market prices are higher than the prices placed in contract, it was argued that farmers were selling the products in open market, which have been produced under contract. In order to avoid this, farmers are forced to sign an open debt receipt in addition to the contract. Moreover, the farmer who is acting in the same manner repeatedly has been punished by contract exclusion for at least a few years. In practice, this approach was called the 'red pencil'. Conversely, when the contract price is over the open market price, farmers try to supply more product which they have obtained from relatives or from outside of the contract's parcels.

There has been a competition between firms and provinces. When a shortage occurs in the production or when demand for processed food has increased, firms which do not have any contractee farmers, have been offering higher prices to the contractee farmers of other

firms.

Another significant problem for processors in the situation of disputes, relates to the fact that the contract itself has no meaning. Going through the court created long delays in order to solve disagreements and disputes between producers and processors. That is why the need for arbitration or a conciliation system is clear.

The processors who do not have any contractual relationship stated they have used contract farming in the past, but no longer do so because they could easily purchase raw material in domestic open or foreign markets. Thirty three percent of them indicated that they could use this system if they needed it.

3.2. General Structure of Food Processing Industry and Contract Farming in the USA

3.2.1. General Overview

The U.S. food system from farm to consumer can be characterized as a capital-intensive and vertically coordinated system through ownership, contracts and other vertical ties. The other main feature of the U.S. food system is a trend toward larger and fewer firms at every stage of food system from farming to retailing.

From the general economic indicators point of view, agriculture is the one of smaller industries, producing 2% of national output and directly employing about 2% of the labor force in 1995. But, agriculture indirectly accounts for much more employment and contributes to national gross domestic product (GNP) through other industries such as manufacturing, processing, wholesaling, and retail trade. If we consider all contributions, agriculture is responsible for providing 15.8% of the total employment and 14% of the nation's GNP (Cramer et al. 1997).

There were 2.1 millions farms in the U.S. with an average 469 acres farm size, in 1995 down from five million farms in 1954. Numbers do not reflect the real concentration. It is argued that most of the nation's food and fibers is produced on about 600,000 full-time commercial farms (Hamilton 1994a). Most of the farms are still characterized as family farms. In 1992, individual proprietorships or family farms accounted for more than 85% of all farms, partnerships accounted for 10%, corporations 4%, and others (estates and trust) less than 1% (Cramer et al 1997). Although a few percent of all farms are incorporated, corporations own 12% of all land and market 22% of the total value of all farm crops (Suits 1995).

Today, almost 90% of farm products reach consumers after having some handling and processing. Within food processing industries, the most dynamic branch was fresh and processed red meat industry. The meat packing and processing industry evolved quickly

into a highly integrated, capital-intensive industry. By 1899 the meat industry accounted for 26% of manufacturing sector sales. Similarly, factory processing of butter and cheese may have begun as early as 1840s (Connor and Schiek 1997). By the turn of the century, about one-fourth of butter and 90% of all cheese was factory made. Canning of sea food as well as fruits and vegetables began in the US around 1820.

Two of today's best known canned food companies were both established in 1869. Grain milling grew relatively slowly, by 1899 it ranked a distant second among the food industries with 20% of the total sales.

The U.S. beet sugar industry was also established about 1869. Animal feed industry was first recorded during this period as by products of grain milling. Until the soybean industry was established in the 1920s, the animal feed industry depended on fish meal as the principal protein sources.

Until the 1850s, nearly all companies were organized as partnerships or proprietorships. In the early 1890s, a massive merger movement began in the U.S. Food processing companies played prominent roles in this industrial restructuring (Connor and Schiek 1997).

The "Beef Trust" was one of the best known and most successful companies to develop control over its market through market-sharing arrangements and extensive vertical integration. One of the best documented history of this period was the "Sugar Trust" and it was reorganized under the name "American Sugar Refining Company" (Amstar) in 1891. At the beginning the Trust was not successful, but in 1893 Amstar and other sugar refineries adopted the basing point pricing system that has persisted to this day.

During the first quarter of the twentieth century, development of the food processing sector grew about 150%. This was slower than the growth rate of the entire manufacturing sector. During this period, the share of the food sector in manufacturing was approximately 22% and remained relatively stable until the late 1940s.

The number of the food processing plants continued to increase to a peak of about 65,000 in 1920. A great decrease in the number of plants has been observed until 1987. The Census of 1992 showed that the number of the plants remained almost constant at 20,000 since the previous census in 1987 (Table 3.2). The greatest decrease was observed during the periods of 1965-1970 and 1979-1989 mainly through merger, acquisition and vertical integration (Connor and Schiek 1997).

Concentration of the firms is a reality in the U.S. Food industry. The total sales of the nation's top 20 food and beverage manufacturers rose 32% between 1992 and 1997. In 1997, these companies accounted for 52% of the industry-wide sales, higher than their 46.5% share in

1992. The total share of the top four firms is 20.3% in 1997 (Anonymous 1999a).

In the U.S., Government intervenes in the agricultural market through several market mechanisms. The U.S. farm price support was initiated in the early 1930s and despite several modifications in detail, general structure was not changed. There are four types of market intervention mechanisms; price support, restriction of supply, credit programs and subsidies (Suits 1995).

Since the 1930s, marketing orders have an important role in the marketing of agricultural products using classified pricing schemes, quality and quantity restrictions, and output restrictions orders. Marketing orders cover many markets: Production of tree nuts, dried fruits, hops, tart cherries, olives, and cranberries is covered by Federal Marketing orders. About 65% of the U.S. milk is federally regulated and 80% is regulated under federal or state laws (Carlton and Perloff 1980).

Marketing orders enable producers to organize marketing boards which are given powers to control the production and marketing commodities. It has been stated that, marketing boards are the only unregulated legal monopolies permitted in the U.S. (Suits 1995). The boards could limit production and regulate prices by restricting the quality and the volume of the products and by assigning quotas to individual producers.

Future markets are used to facilitate many agricultural products in the U.S. since mid-1800s such as Minneapolis Grain Exchange and The Chicago Board of Trade. The main purpose of these exchanges is to provide a place in which the activities of buyer and sellers determine the prices of commodities. At these exchanges, traders buy and sell futures contracts as physical commodities (Cramer et al. 1997). Of course there is some close relationship between contract production and the futures market. On one hand the rapid growth in contract farming has encouraged futures trading in other commodities. For example, contract farming in broilers has led to an increase in futures trading in corn, soybeans and soybeans products. On the other hand futures markets generate considerable information as price quotes permeate the whole market (Lethould 1976).

Cooperatives have a major role in the U.S. food system. The latest available data shows that there were 2,173 marketing and 1,496 supply cooperatives (the numbers were 5,727 and 3,222 in 1960 respectively). Farmer cooperatives are important for producers, marketing about 31% of the agricultural products and providing 29% of the major inputs such as fertilizer,

feed, seed etc⁹. In 1997, farm cooperatives share (\$10.15 billion) was nearly 9% of the total agriculture sector net value-added (\$92.8 billion). Marketing cooperatives accounted for nearly 68% of cooperatives gross and net value added, farm supply 28% and related service cooperatives 4% (Kraenzle and Cummins 1999).

Among the marketing cooperatives, bargaining cooperatives are special for U.S. agriculture. This type of cooperative is also important for the contract production because of their main function in determination of trade terms between producers and processor. The most frequent trade terms that are bargained for by bargaining cooperatives are price, time of payment, quality provision, rights and responsibilities related with production (Marion 1986). In the USA, in many agricultural bargaining cooperatives have become an integral part of the marketing system of certain agricultural commodities (Marcus and Frederick 1994).

In 1992, there were 29 active fruit and vegetables bargaining associations representing 36 commodity groups (Iskow and Sexton 1992). Inability to increase membership, managing supply and controlling non-member free riders are among the main problems facing bargaining associations.

There is considerable support for cooperative group actions in agriculture through laws in the USA. The Capper-Volstead Act of 1922, Cooperative Marketing Act of 1926, Agricultural Marketing Agreements Act of 1937 and Agricultural Fair Practices Act of 1967 have provided some arrangements to advance group actions in the marketplace (Torgerson 1998).

3.2.2. Vertical Coordination and Contract Farming in the USA.

Almost one-third of the total value of production on U.S. farms is produced under contractual arrangement. While contracting has been significant and growing since 1960s, farmers have used contracts to produce or market agricultural commodities since early the 1900s. Changes in the number of the farms involved in vertical coordination between 1970-1990 can be seen from Table 3.3. According to the 1993 Farm Costs and Return Surveys (FCRS), 32% of the total value of agricultural production was produced under contract arrangements (Perry et al. 1996). Between 1991 and 1997, the share of commodities produced under marketing contracts increased from 16% to 22% of the total U.S. value of

⁹ Cooperative aggregate market share in the United States measured at the farm gate is roughly 30%. The share is significant moreover, across several industry groups, including dairy 77%, cotton 36%, grain and soybeans 36%, fruit and vegetables 20%, and livestock 11% (Sexton 1990, p. 709).

production (Perry et al.1997). There are generally two types of contracts: marketing and production contracts.

Marketing contracts: Refers to verbal or written agreements between a contractor and a grower that sets a price-or pricing system- and an outlet for the commodity before harvest or before the commodity is ready to be marketed. This type of contract can take many forms:

- Forward sales of a growing crop, where the contract provides for later delivery and establishes a price or contains provisions for setting a price latter.
- Price setting after delivery based on a formula that considers grade and yield.
- Pre-harvest pooling arrangements, where the amount received is determined by the net pool receipts for the quantity sold.

Production contracts: These contracts specify detailed production practices, input supplied by the contractor, quality and quantity of a particular commodity, and set a price or pricing mechanism.

In the U.S. agriculture, farmers can be contractors. As in the outgrowers schemes, big farmers, often, in animal production acting as contractors. The farmer as a contractor, can specialize in one of the stage of production, and pay another producer to either provide young animals or finish the production of commodity.

Marketing contracts are often used for crop production. In 1993, almost 40% of the value of all fruit and vegetables were produced under marketing contracts. The percentage of other crops produced under marketing contracts were sugar beets (82%), cotton (33%), soybeans (9.4%) and corn (8%).

Production contracts are more likely used for livestock production. Poultry and poultry products produced under production contracts accounted for over 50% of the total value. On the other hand, 33% of the value of production hogs and 14% of the cattle were covered by production contracts (Banker and Perry 1999).

The contractor usually stipulates grading standards along with terms for compensating the grower. More commonly, in California and Washington, the amount paid to the grower is negotiated through a bargaining association that represent several producers.

Despite the availability of several legislative arrangements which are directly or indirectly affecting production contracts, there is no specific regulation directly related by contract farming at federal level. Many states have considered legislative proposal, but only Minnesota, Wisconsin and Kansas have enacted new laws on the subject (Hamilton 1994b). In 1990, Minnesota enacted legislation to protect growers. Among other stipulations, the law requires notice before termination, the right to cure, and reimbursement for

investments in the case of premature termination. This law has become a model for other legislative proposals. In 1993, Wisconsin passed legislation that allows a grower a 72-hour grace period to cancel a contract. It also requires integrators to specify in writing all conditions that might cause deductions in payments to growers (Levin-Solomons, 1999). Processors often oppose such legislation. For instance it was reported that, legislation to protect poultry growers in Alabama in 1994 failed after a \$90,000 lobbying campaign by processors who claimed that the law would undermine the broiler industry in that state (Hamilton 1994b).

Enforcement of lien is an important legal issue to protect farmers. During a production failure resulting in losses to creditors or in the case of bankruptcy, the lien secures the amount to be paid for the product by the processor to the grower or producer. For instance, California enacted a producer's lien statute to protect farmers (Peterson and Peck, 1997). Unlike California, Oregon has two separate producer liens. The Agricultural Producer Lien covers fruit, berries, vegetables or meat animals and The Grain Producers Lien covers grains (Watson, 1997).

Vertical coordination structure and contracting in some of the important sub-sectors from the contract production and backward integration viewpoints are analyzed in detail below.

3.2.2.1. Broiler Industry.

After World War II, the broiler industry grew into one of the most integrated of the U.S. agricultural industries. Today integrators produce nearly all broilers under contract with growers. Broiler production nearly tripled between 1940 and 1945 despite poor feed quality and heavy disease losses (Martinez 1999). The high volume of military demand actively encouraged production in newly emerging commercial production areas (Goodhau and Rausser 1999). Besides this incentive, following the war, adoption of technological advance in genetics, disease control, nutrition and material handling have accelerated development of industry. These innovations increased the size of the production unit. During the early stage of broiler industry, growers would buy feed from a dealer, chicks from a hatchery, and other supplies from another dealer selling to the processors who offered the highest price. Along with the high capital requirements of new technologies, fluctuation in the live broiler prices left the broiler growers in financial difficulties.

Large feed companies recognized the potential of broiler industry and established production contract with growers. The first recorded broiler contract was signed in 1933 (Martinez 1999).

A rapid increase in the higher supply caused a drop in the live broiler prices toward end of the 1950s. Many hatcheries and feed companies experienced considerable losses because of the overproduction and depressed broiler prices. In order to coordinate production capacity at each stage, feed companies became more directly involved in the broiler business. They developed a closer relationship with processors by acquiring or merging with processors and by building growing facilities.

As feed companies increased their processing operation, independent processors and producers found themselves with fewer markets for buying and selling broilers. Hence, independent processors established their own contracts with feed companies to obtain birds or with growers to produce the birds.

In the 1970s, many feed companies left the broiler industry because of depressed broiler prices and high input costs. Processors took over control of almost all stages to gain efficiencies from improved coordination.

Presently, few major processors control the vertical stages in broiler industry from breeding to market ready products, through vertical integration and production contracts. In 1950, 95% of broiler producers were independent. More recently, independent producers accounted for only 10% of total broiler production, whereas 88% were produced under a contract arrangement and 2% were produced in company-owned broiler facilities (vertical integration) (Martinez 1996). Today nearly all broilers are grown under contract (92%) or in integration (8%) (Table 3.3).

A 1996 survey of broiler companies conducted by the Broiler Industry listed 48 companies, which account for almost the entire U.S. broiler production. The top 15 companies jointly control 77% of the total industry production. The largest broiler company produces about 22% of the entire broiler output. According to a survey conducted with 19 broiler companies, 17 company were using tournaments as the way of setting prices, the remaining two companies were using fixed performance standards (Tsoulouhas and Vukina 1999). Knoeber and Thurman found much stronger evidence of risk reduction in the broiler chicken industry under relative performance contracts. Their research concluded that 89% of the broiler growers showed statistically significant variance reduction with relative performance contracts as compared with standards (absolute) performance contracts (Knoeber and Thurman 1995).

As the broiler industry has become more integrated, the types of the contracts have also changed. The first contracts between integrators and growers were **open account contracts**. The other types were **guaranty-price contracts**, **flat-fee contracts**, **feed conversation contracts**. Today, **combination contracts** are often used

which combine the desirable attributes of previously used contracts.

Production contracts (resource providing contracts) are legal agreements between an integrator and a farmer (producer) that bind the producer to specific production practices. Broiler contracts vary, but all of them have two common features. One of main features is the division of responsibility for providing inputs. The other important feature is the method used for grower compensation. Growers provide land and housing facilities, utilities (electricity and water) and labor. Operating expenses such as maintenance, repair, chicken house clean up, and manure and dead bird disposal are also the responsibility of the farmer (Vukina and Foster 1998). The integrator provides chicks, feed, medication and advisory services. Typically, the processor company owns and operates hatcheries, feed mills, processing plant and provides transportation of feed and live birds. The other inputs such as fuel and litter can be the responsibility of either the integrator or the producer or can be shared. Most of the integrators require strict technical qualifications regarding construction and equipment of chicken houses. Chicks of certain genetic characteristics and feed mix are also provided by the integrators. Broiler contracts can be only one flock or more than just one production cycle (Hamilton 1994b).

Poultry (or livestock) contracts differ from those used in other commodities because contracts do not involve the sale of commodities, instead they create other forms of legal relationship such as service contracts. That means contract growers do not own the product. They are being compensated for what they provide, land, building, fuel and labor. That is why producers could be accepted as relative piece-rate workers (Skully 1998).

Problems between grower and processor often result in litigation. The more common claims include: Early contract termination, requirements for additional improvements, manipulation of quality, quantity or cost of inputs, under-weighting of poultry and feed, mis-evaluation of the producer's performance etc. (Hamilton 1994b).

Integrators can force changes in operation whenever they wish, since there is no contract to prevent such changes. Broiler growers often complain that these changes are excessively expensive (For example new ventilation system), but almost they have no choice since they have large sunk investments. It was argued that in this situation growers face a "hold-up" problem (Lewin-Solomon 1999). Another source of risk for the grower is non-renewal of the contract (Aust, 1997).

Most broiler contracts have a similar remuneration scheme which include minimum guaranteed payment,

performance payment, and disaster payment. The performance payment is based on a fixed base price per pound of live meat produced and the variable bonus payment is based on the grower's relative performance. The bonus payment is determined as a percentage of differences between average settlement costs of all growers that belong to the integrator's particular center whose flocks were harvested in the same period and producer's individual settlement costs. Settlement costs are obtained by adding chick, feed, medication and other customary flock costs and dividing by the total pounds of live poultry produced. For below-average settlement costs (above-average performance) the grower receives a positive bonus, and for above average settlement costs, he receives a negative bonus. A grower with settlement costs substantially above the average cost (typically this threshold is set at 1.25 cents) will be excluded from the average, hence, other growers are not rewarded when one grower performs badly. Similarly, costs that are substantially below average also are excluded from the average (Vukina and Foster 1998).

The total payment to the grower can be formulized as follow.

$$R = (b + B) q$$

where, b= Base payment per live pound, B= Bonus payment per live pound, and q= the number of pounds of live poultry.

If the producer's revenue based on performance payment is smaller than some guaranteed amount, the minimum payment formula will be applied. In the case of a disaster such as fire, flood or storm, involving a lost of a part or entire of the flock, the grower will be compensated based on the disaster payment.

Organization of poultry growers is important. The recent most significant attempt was the formation of National Contract Poultry Grower Association.

3.2.2.2. Pork Industry

At the beginning of the twentieth century, most hogs were slaughtered by the five largest packers. They generally purchased most of their hogs through commissions from local markets.

Since the beginning of the 1900s, the number of farms that raise hogs have been falling and the average inventory per farm has risen steadily. This trend has continued during all of the twentieth century. Prior to 1993, most pigs were raised on farms with fewer than 1000 animals in inventory. In 1996, 4,880 U.S. farms with at least 2,000 pigs in inventory accounted for 51% of the total U.S. swine inventory (Zering 1998). The pork sector has two production stages, farrowing and

finishing. Two decades ago, most hog operations were integrated farrowing-finishing operations. There has been a trend toward larger, more specified farrowing and finishing operations in recent years (Ward, 1997).

In recent years, multi-year marketing contracts have been widely used between the large hog producer-integrators and large packers. In 1999, 59% of the hogs in the U.S. were obtained through multi-year contracting while only 2% were contracted in the 1970s and 1980s (Martinez 1999). These contracts typically specify that the producer deliver a certain quantity of hogs to a certain location at a specified time. In return, the producer receives a market-based price that is adjusted for quality premiums. A considerable amount of large hog producers sell their animals on the open market. A majority of the contract hog production is horizontally contracted among producers. The producers having more assets, managerial skills, and are the risk-taker provide the hogs and the feed to others who raise them (Lawrence et al.1997).

Hog production and marketing contracts are generally written to last five to twelve years and often require the provision of a notice of termination no shorter than a specified period, usually about six months. Provisions often exist to extend the initial terms for an additional time period subject to mutual agreement. In addition, it is possible to renegotiate the terms if new technologies or regulation arise (Hennessy and Lawrence 1999).

According to a 1994 survey, more than 50% of hogs acquired by packers were under long-term contracts via formal, written contracts with a definite term often ranging from 4 to 7 years. Likewise, large producers indicated that 63% of the contracts were written rather than verbal and 59% were for a fixed period (1 to 15 years). The remaining contracts were verbal and typically continued until canceled (Lawrence et al.1997). The packers involved in these arrangements required a minimum value of hogs with either minimum quality standards or specific genetics.

According to another survey conducted in 1996 with the 17 swine companies, two firms used tournaments, nine used fixed performance standards, one used a fixed payment per pound, one used the bracketed scheme, one paid a fixed rent per square foot of the house, and three companies were growing pigs on company-owned farms (Tsoulouhas and Vukina 1999). Some research results have shown that, relative to independent production, contract farming reduces grower income variability. Relative performance contracts have the potential to further reduce income variability as opposed to absolute or standard performance contracts. Martin (1997) argued that relative performance contracts reduced income

variability for 36-70% of the contract growers (Martin 1997).

Historically, production contracts have existed in three different categories of the pork production system, and recently two additional categories of contracts have emerged. Of these categories, the most common contract is for the finishing phase (Martin 1999). Despite different types of contracts changing from region to region, widely used payment methods for the finishing contracts were presented by Martin (1999) as follows:

- i. Payment per pound of gain + Potential bonus; Grower payment = $\$0.05 \times (\text{Pound gained}) + \text{feed conversion bonus} + \text{mortality bonus}$.
- ii. Payment per hog marketed + Potential bonus; Grower payment = $\$10.00 \times (\text{head marketed}) + \text{feed conversion bonus} + \text{mortality bonus}$.
- iii. Payment per square foot or per pig space; Grower payment = $\$4.00 \times (\text{Square feet available in barn}) + \text{any potential bonuses}$ or, Grower payment = $\$32.00 \text{ per pig space per year} + \text{any potential bonus}$.

Bonuses and performance incentives are important for both parties involved in the contract. In general, a bonus is determined for a low feed conversion ratio and a low mortality rate. For instance, if a standard feed conversion ratio in the contract is 3.2, but the producer achieve a 2.9 feed conversion, the grower would receive a \$1.50 bonus (50 cents for each 1/10 point difference) on each animal marketed. For the mortality rate, a 2% death loss standard frequently appears in contracts (Martin 1999). Recently manure management also became an important factor in contract arrangement.

Production contracts give the responsibility to growers for providing facilities, labor utilities, waste disposal, land, and water. Contractors provide feed, livestock, veterinary care and medication, managerial support, and marketing. The contractor bears all market risk and keeps any residual profit or losses (Zering 1998; Swinton and Martin 1997).

Pork producers are rather well organized. The principal organization is The National Pork Producers Council (NPPC) which is a producer organization that claims a membership of 85,000 producers in 44 affiliated state associations. The NPPC is governed by a board of directors elected by delegated who are elected by producers (members) in each state association. Another nation-wide organization is National Pork Board which is an independent body of 15 members appointed by the Secretary of Agriculture. Members are producers from at least 12 states and or importers (Schrader 1998).

In the past, the role of cooperatives has been small while their share of feed supplied to hog producers may be as high as 45% in some areas (Schrader 1998). More

recently, Farmland Industries has attained about 6% share of hogs slaughtered and other cooperatives have actively increased their shares. New cooperatives have been formed to supply feeder pigs for producers. Some corn producers have formed hog production cooperatives as a means to market corn. In addition, group marketing, especially by smaller producers, is increasing (Schrader 1998).

3.2.2.3. Dairy Industry

Milk marketing in the U.S. is regulated by Federal Milk Marketing Orders. Marketing orders classify milk by ultimate use by consumers. For example, Class I is milk for fluid consumption. Milk orders specify minimum prices that buyers must pay for milk used in each class. Federal order prices are minimums only. Market conditions can often lead to prices above Federal order minimums. Milk orders also specify rules for distributing milk (Anonymous 1999b).

The dairy sector of the U.S. has been exception among the other agricultural sector in that producers cooperatives have an important role in milk marketing and processing. According to 1997 data, dairy cooperatives received or bargained for 83% of all milk sold by farmers. Ninety eight percent of the total amount of milk received by the cooperatives came directly from member-producers, the remaining 2% came from non-members or non-cooperatives firms. Between 1992 and 1997, the number of dairy cooperatives decreased from 265 to 226 while the number of bargaining cooperatives increased from 135 to 138 (Table 4.4) (Ling 1999).

Dairy cooperatives can be classified into three categories based on their function in the marketing channel (Ling and Liebrand 1998).

- i. Bargaining cooperatives: These cooperatives operate as bargaining associations. Government administered milk prices serve as a floor and the starting price in the bargaining process. Milk payment is usually pooled. In 1997 there were 138 pure marketing cooperatives, 44 cooperatives which have receiving stations were also acting as bargaining cooperatives (Table 3.4).
- ii. Bargaining-balancing cooperatives: These cooperatives bargain for milk prices and also manufacture the surplus into commodity dairy products for supply balancing.
- iii. Others include undifferentiated hard product manufacturing, niche marketing, fluid processing and diversified dairy cooperatives.

The experience of dairy cooperatives can be useful for other agricultural industries facing pressure of vertical integration.

3.2.2.4. Vegetable Processing

Vegetables for processing are mostly produced under contracts. The only exemption are those perennials crops such as asparagus and some potatoes which are produced for both processing and fresh market (Marion 1986). In 1993, 11,700 farms reported at least one crop production contract. Nearly half of these farms had contracts that involved processed vegetables (Perry et al. 1996).

In general, a crop production contract indicates which inputs will be provided by the contractor, limited in most cases to seed and custom services such as harvesting and hauling. The amount to be produced is specified with detailed requirements regarding production practices such as chemical and fertilizer applications. Sometimes, the contracts' quality provisions can be very detailed and strictly enforced. Many contracts include provisions requiring the grower to use only pesticides that approved by contractor. The contractor generally stipulates grading standards along with terms of compensation the grower. According to a Farm Costs and Returns Survey (FCRS), contractors provided seed to nearly 80% of the farms with a single production contract. The share of the farms getting special hauling services was 70% and the percentage of the chemical provided was reported as 60% (Perry et al. 1977).

For payment purposes they often use fixed price, applying premiums or discounts based on the quality of the crop. Vegetable producers are generally well organized under a bargaining cooperative (Hamilton 1994b). In most cases, the association does not assume title to the vegetables.

Vegetable contracts involve either guaranteed shipments in pounds per week are based on acres of production. Another special feature of vegetable contracting is the application of "passed acres" in which the integrator has the right not to harvest or accept all the crops raised under the contract. One of the most common reason for this application is the crop raised is larger than the quantity the processor can handle (Hamilton 1994b).

In order to get detailed information about contractual relationships at the field and farm level between producers and the first handler of the fruit and vegetables (processors or wholesalers), the findings of a research done by Hueth are summarized (Hueth 1999). The contract between producers and integrators is generally a detailed written agreement that sets forth specific plans concerning when and how particular crop should be grown. However, sometime coordination might also realized with an informal mechanism through repeated interaction. Even when a contract takes a written form,

there may still be a number of provisions which are only implicitly understood by both parties. It was determined that the coordination mechanisms used to arrange contracts vary considerably across commodities. Commodity attributes, local tradition, technology, and government regulation were identified as important factors which potentially affect the type of coordination and content of the contracts.

Hueth (1999) mentioned the proprietary nature of the contracts. He stated that "even if it is possible to obtain an example of a written contract (some integrators actually prohibit growers from sharing their contracts with anyone but the grower's lawyer), the explicit terms of contracts reflected in formal documents are only part of the story".

According to a survey of processed and fresh market commodities (15 fruits and vegetables), input control was provided through selection of seed variety, and plants, fertilizer, pesticides, labor, and financial support. Monitoring is carried out by fieldmen who provide technical information and communication in addition to controlling grower's behavior. Monitoring efficiency were evaluated by the median of annual field visits per grower for each commodity which was varied between 1 and 100 annual visits. The different bases were used for the quality measurement. In ten of the commodities, some form of in-house quality measurement was used; in eleven commodities, government sponsored services; and in five commodities, some form of third-party services were used. In almost all of the contracts, residual claimancy were used.

There is a difference in emphasis given on quality measurement between processing and fresh market integrators. All of the interviewed processors have been using detailed measurement of quality to adjust grower payment, while fresh market integrators have been rarely adjusting the grower's payment (Hueth 1999).

3.2.2.5. Beet-sugar Industry

Since the beginning of the U.S. beet sugar industry in 1879, sugar beets have always been grown under a contract. In 1995, there were 9 companies processing beet sugar and three of them are grower owned cooperatives. American Crystal Sugar Company (ACS) was incorporated in 1899 as American Beet Sugar Company. In 1971, the company cut 20% of the contracted beet acreage in some states and closed some processing plants in different states (Balbach 1998). The differences between the farmers' interest and decisions of the company has created conflicts. Red River Valley Sugar Beet Growers Association decided to buy American Crystal and form a cooperative. The growers who supply sugar beet to the company became the

owner. Despite the decline in the sugar-beet production in the several western states, American Crystal Sugar's acreage increased from 165,000 acres in 1972 to 400,000 acres in 1992.

In the first sugar-beet contracts written in the U.S., payment was based on tonnage of beets delivered and sugar content. Major changes in contracts were made during WW I. The price of refined sugar rose more than 75% when price controls were removed. Sugar beet growers wanted to share this sugar price increase. Payment scales were changed to sugar content and the market price of sugar base, and ACS changed the payment system and added the average net selling price base instead of a fixed price per ton. This system is still used by the traditional owner-investment companies. In the 1970s, the cooperative processors made another change in beet contracts. They developed extractable sugar contents. This contract is based on the actual amount of recoverable sugar per ton of beets. A new system was developed to measure the amount of recoverable sugar by measuring the sugar loss to molasses. The amount of sugar lost in the molasses by product is measured as a percentage of total sugar content. The pounds of sugar recoverable from a ton of beets is calculated by subtracting the percentage sugar loss to molasses from the percentage sugar content. For example, beets with a 17.57% sugar content and a 1.495% sugar loss to molasses yield 312.5 pounds recoverable sugar per ton of beets.

$(0.1757 - 0.01495) \times 2000 \text{ pounds per ton} = 321.5 \text{ pounds per ton.}$

According to Balbach (1998), this new system only used by cooperative processors, provides an efficiency through decreasing production costs for refined sugar, sugar loss to molasses and increasing the extraction rate and also sugar produced per ton of beet sliced.

Two types of contracts are used by other non-cooperative companies. The eastern contract and the western sliding-scale contract. In the eastern contract, growers and processors share revenues and costs at a fixed ratio. Growers receive 53.1% of the gross sales of sugar and by-products less 53.1% of the marketing costs. Growers are responsible 53.1% of the sugar losses that occur in storage. All of the production costs belong to growers. Also, there are incentives based on the impurity level. In the western contract, the payment per ton of beets depends on the average net return per 100 pounds of sugar received by the processing company and the individual sugar contents of a grower's beets. The extraction rate is fixed.

3.3. A Comparative Analysis

Naturally, there are big differences between Turkish and U.S. agricultural production and farming structure. Turkish agriculture can be characterized as a sector in transition from a traditional structure to an industrialized sector. The agricultural structure in the USA is completely industrialized. Agriculture share both in the population and GNP is approximately 2% in the USA, these figures are about 35% and 13% respectively in Turkey.

In Turkey, there are more than 4 million farms having increasing tendency in number. The average farm size is 5 ha. In the U.S. the number of farms is only 2.1 million having a decreasing trend in number with 189.5 ha average size.

The Turkish food industry began to develop only after establishment of the Turkish Republic in 1923. Inevitably, establishment of the food industry was initiated by the State as in other sectors through establishment of State Economic Enterprises (SEEs). This came as a result of the "etatism" which was one of the main principles of Turkish Development Movement. Originally, the SEEs were supposed to operate with a high degree of autonomy and to survive for profits as a private entrepreneurship. After about eighty years the SEEs are still running as State Enterprises which are subject to privatization in recent two decades.

The lion's share of the food is still consumed in an unprocessed form as household production in Turkey. The processed food share of the supply is estimated at 10-20% of food consumption. There is a dual structure in the food industry. There are plants that are large in size, more modern in technology, and sometimes integrated with international companies which are oriented mainly for export. However, a considerable share of the food handling is realized by small and medium size processing units which have rather backward technologies. According the recent data there are 25,388 firms in the industry but only 1,350 of them have rather large capacity which have more than 10 employees.

In the USA, the food sector began a structural transformation during the late 1800s from one that served demand for predominantly unprocessed foods toward a more concentrated one, handling increasing amounts of processed foods that reached 90% of total food consumption today. The growth in importance of very large, capital intensive, and diversified food manufacturing firms has been the result of the need to achieve economies of scale in mass production and distribution as well as control over new food processing technologies. In 1992, there were 20,000 food processing plants in the USA, of which 44.9% have 20

and more employees. There is high firm concentration in the sector. The total sales of the nation's top 20 food and beverage manufacturers accounted for 52% of the industry wide sales. The total share of the top four firms is 20.3% in 1997.

Cooperative movement in Turkey was also started as a Government initiative. Today, about one third of the farmers are members of Agricultural Sale Cooperatives (ASC) which have considerable share of the food processing and marketing industry. Unfortunately, despite several attempt to reorganize them, ASC are still running as SEEs, i.e. the member farmers have no control over management. Some of the large processing plants belong to these cooperatives. Instead of establishing a democratic structure where the farmers have the right of control and management, processing plants of these cooperatives are considered to be privatized.

Agricultural cooperatives have a significant role in the agro-food system of the USA. Cooperatives have considerable share in providing production input, marketing of agricultural products, and food processing. Among the marketing cooperatives, bargaining cooperatives are special for U.S. agriculture. The cooperative movement started in the U.S. as a private initiative instead of direct state involvement. This movement was supported by enacting laws that encouraged group action in agriculture. For instance, the Capper-Volstead Act of 1922, Cooperative Marketing Act of 1926 as well as Agricultural Fair Practices Act of 1967 have promoted and facilitated group action in agricultural markets.

Futures markets used to facilitate many agricultural products have a long historical background in the USA while these are only recently realized in Turkey despite the availability of commodity exchanges for agricultural products since 1892.

There are also significant differences among the agricultural policies of Turkey and the USA. Market intervention through support purchases for a limited number of agricultural products, direct input subsidies, and providing selective credit are the main agricultural policy methods in Turkey. Besides the price support, supply restriction, credit programs and subsidies, marketing orders have an important role in the U.S.

As a main distinctive feature of the industrialized agriculture in the U.S., vertical coordination through contractual relationship is widely used. In general, approximately one-third of the total value of agricultural production is realized under contractual agreement. Some sub-sector such as broiler and beet-sugar industries are totally integrated either through contractual relationship or vertical integration. In

Turkey, contractual relationship started to be used by the state as a natural result of the government initiated industry structure. Today, only beet-sugar processing is realized under totally contractual arrangement, while in other sub-sectors (broiler and vegetable processing) contractual relationships have been developing parallel to the development of the processing industry.

In the USA, there is no specific regulation at the federal level directly related to contract farming. Many States have proposed legislations, and some (Minnesota, Wisconsin and Kansas) have specific legislations in place. A special regulation on contract farming was enacted in 1996 and later amended in 1998 in Turkey. There are differences among the content of contract farming legislation. In Turkey a general framework is outlined in addition to giving responsibility to the Ministry of Agriculture as a third party to involve in case of disputes. Legislative arrangements in the U.S. usually content stipulations to protect farmers rights.

There is similarity between the weak position of the farmers in the contractual arrangements both in Turkey and the USA, even though some of the farmers are well organized under bargaining organizations in the States.

The content of contracts (such as payment mechanisms) is rather comprehensive in the U.S. This has come as a result of a long history in contracting as compared to the contracts in Turkey. It is not surprising to observe similarities between the general content of contracts in the present globalized world considering the contract production activities of some multinational American companies (Pioneer, Philip-Morris, Cargill) in Turkey.

4. A Cooperative Approach to Contract Farming

Outgrower schemes have been used mostly in the developing world as a means of contract implementation. They have a great variety with their hybrid structure and multiple objectives. Therefore, it is not easy to point out a standardized form for those schemes. A simplified model is discussed here for a standard (Private company scheme) contract production form to have a fair and successful implementation of contract farming for both sides, the agricultural sector and the economy as a whole (Figure 4.1) (Rehber 1998).

First, producers/growers and integrators (handler, processor etc.) must want to collaboration and/or cooperate. Both for the producers and processors, it is important to have established reputations for honesty and fair dealing. That means, farmers should look at integrators as partners who are working for them rather than rivals. The same behavior is expected from the integrators. Both sides are in need of each other in order

to make a contractual relationship which is working toward their mutual benefit. Otherwise, this cooperation will be a source of dispute and dissatisfaction.

In contract farming systems, the individual producer has had the most reason to feel weakness in his lack of market power. However, the history of agriculture demonstrates that growers have been seldom rewarded appropriately in the market place due to weakness in their position as farm entrepreneurs compared with other participants in the food industry. That is why it is important for producers to act in an organized manner. As Anderson (1994) stated: "Recognition gained by organized groups is better as opposed to the lack of recognition accorded to unorganized farm producers," organizing a bargaining cooperative among farmers makes them rather powerful in a contracted relationship (Scheid 1991; Moore 1994).

Local bargaining organizations can be organized on the regional or national level. In practice, negotiation is an arguable problem under such organization. Collaboration and negotiation between farmers and processors might be better carried out in a decentralized way i.e. at the local level. A nation wide farmer and food industry organization could act as an administrative organism. It could retain a role as arbitrator and guarantee the application of private agreements. Experimentation, development of reference, and agricultural techniques would probably remain the responsibility of the central body.

Such an organization also can allow collaboration with the integrators' organization. The producers and processors could act together. For example California Tomato Growers Association needed to take a more active role in controlling imports. This led to the formation of National Association of Growers and Processors for Fair Trade (Marcus and Frederick 1994). This trade group was an alliance between growers and leading tomato processors that was successful in initiating a negotiation between U.S. and Israel. In general, a common action between producers and processors' organizations can be realized to impose regulation on imports and in some aspects; market development, political action, and adjustments to consumer demand.

In contractual arrangements, the role of the integrator firm is so important by determining the most of the production and marketing practices and measures. Therefore the efficiency of the firms' activities directly affects the efficiency of contract farming. The first step in successful implementation is establishing of a sound organizational body. Contracts could vary from company to company, but all must have a special unit which is dealing with all contractual issues and is

equipped with necessary personnel and equipment. Also its relationship to the other functions of the firm must be determined clearly (Brown et al. 1994).

The role of government is an another important factor for successful application of contract farming. The first function of state authority might be legislative arrangement. In agriculture, with a tremendous variety of production enterprises, it is not possible to establish all encompassed contract models which has strict rules. Instead, governments could establish a framework for a contract, and enact regulations to solve disputes and/or take part in arbitration to some extent. Beneficial tax treatment, exemption from antitrust status, selective interest rate (below the market rate), and free technical assistance through extension services could be listed among the Government's policies favorable to cooperatives.

The direct role of government in the contractual mechanism, agricultural support and intervention policies aimed at improving contract farming can be effective and functional. In the USA, for example, some product marketing orders reinforce the bargaining strength of farmers. In the European Union, according to the Commission Regulation, the production aid system is based on contracts between producers and processors and the particulars to be included in the contracts for the purposes of the aid system should be specified (Anonymous 1984).

Tax policy is an another aspect which must be considered to promote contract farming. Contract farming can be considered a way of record keeping systems. Farmers are presently reluctant to involve in such arrangements for fear that they may pay more taxes especially in countries where book keeping is not compulsory for the family farms. Therefore adopting a tax policy which facilities the situation could be recommended.

On one hand, specialization to produce a single product through contract farming has increased the profitability level. On the other hand it will increase the risk farmers face. Agricultural crop insurance policies could be a considerable way to promote risks reduction for both farmers and processors.

Ineffective extension and training policies of the governments could be improved through contract farming. Credit policies in agriculture also could be realized by contractual arrangements. For example it is possible to consider the contract itself as collateral. Such activities linked with the contractual relationship could be rather effective.

An independent organization to resolve disputes between firms and farmers, which are the major causes for failure in contract farming is recommended. Solving

disagreements and disputes over quality standards, delays in delivery and payments, and default on loans through the court systems creates long delays. An arbitration and/or a conciliation system would be useful by involving government and non-governmental organizations (Spolter 1992). In arbitration, an arbitrator renders a decision and third party imposes it taking all the control away from the parties. In a conciliation or mediation process, the parties retain control of the process and the outcome.

5. Conclusions and Suggestions for Marketing Efficiency

The agro-food sector from producer to consumer involves a range of discrete and complementary activities changing from farm input procurement to consumption. The vertical relationships between these activities range from open market transactions to vertical integration. Over time impersonal and open-market transactions between activities in traditional agro-food systems based on price signals are replaced by rather controlled, impersonal vertical coordination mechanisms such as organizing cooperatives, short and long-term contractual relationships, and ownership integration in the advanced and industrialized systems. Changes in food consumer preferences, attitudes, technological improvements, food safety issues and related regulations are main forces behind industrialization

In light of investigated theories, one of the main reasons for vertical integration is transaction costs. Vertical coordination through ownership integration decreases transaction costs but creates its own costs. Some distinctive features inherent in production of agricultural commodities and markets favored the use of contractual relationships in agriculture versus full-integration (ownership integration). However, even in ownership integration, internalizing all transactions in a firm does not preclude the use of contracts, i.e. a firm can have all production assets or have complete control of them but need to hire labor and use labor contracts. In the cooperative structure, the relationship between member producers and their own organization (cooperatives) often requires formal linkages more constitutive than contractual relationships. On the other hand, specialization in one of the stages of the agro-food chain can provide cost advantages. Therefore, coordination among the specialized firms through contractual arrangements or even open-market relationships may be more efficient versus ownership integration.

In practice it is not possible to have a complete contract because it is not possible to foresee all

contingencies in advance (**bounded rationality**), it is difficult to describe and write these contingencies accurately and there will be a cost for writing down such a plan and realizing it and solving disputes. In practice, contingencies inevitably arise that have not been planned. In this case, parties must find ways to adopt. These adaptations introduce the possibility of **opportunism**. In general terms, incomplete characteristics of the contracts lead to problems of imperfect commitment. Under information asymmetry, there will be a **moral hazard problem** which limits the contracts that can be written and enforced.

Asset specificity, task programmability and separability are primary determinants of the degree and type of vertical coordination (**governance structure**). In the contractual relationship, the length and the comprehensiveness of contracts are dependant on the above features. In the case of high asset specificity that cause sunk cost may create a hold-up problem. Another important determinant is uncertainty regarding production and marketing.

It is a fact that the role of successful management (**strategic management**) is very important for efficiency in every kind of vertical coordination. Improvements in managerial approaches in relationships for both intra-firm and inter-firm transactions based on **trust, confidence and mutual understanding** could be interpreted critical issues in financial and economic efficiency. Legal and/or incentive systems based on reward and penalties can be used creating trust and mutual confidence. Desired method is availability of coordination consciousness that the processor (principal) needs a group of producers (agents) as much as the producer needs the processor as explained in our cooperative model.

Quality and quality control is one of the important issues in every stage of the agro-food chain. A quality convention is required among the transaction parties in these stages. Quality requirements can be best defined and controlled by a third party, government and/or independent organizations along with the internal convention in the food chain.

In general, both for farmers and integrators, one of the significant reasons for contract production is to decrease uncertainties (risks). Under contract integration, producers bear some of the production risks, but price risks for the contracted commodity and most variable inputs are transferred to the integrator. A guaranteed market, easy access to credit facilities, and information are among the reasons for contracting for producers. For integrators the main reason is to provide a steady input supply with a certain quality and quantity.

In addition to the reasons mentioned above, recent

sophisticated ideas such as environmentally sound, sustainable agriculture, and standards and regulations related to environment and health safety are the initiatives behind the fast growing close vertical coordination and contract farming.

The reduction in producer's and integrator's risks are replaced by other risks and problems related to the implementation of contracts. Integrators can force changes in operation at will since there is no contract provisions to prevent such changes. For instance, broiler growers often complain that these changes are sometimes are excessively expensive but they have no choice since they already have large sunk investments. In Turkey, the group approach and extra debt receipts for inputs provided by integrators create problems for the producers. Generally, contracts are prepared by the integrators and often the language is used that is not easily understandable by the producers. The contract is generally in written form, but the explicit terms of contracts reflected in the documents are only part of the story. That is, some of the provisions are implicitly used by the integrators. Other more common claims of the producers include contract termination, manipulation of quality, quantity or cost of inputs, and mis-evaluation of production performance. Some of the contractual relationships create new legal arguments. For instance, in poultry production, contracts do not involve sale of commodities. Instead they create other forms of legal relationships as service contracts. That means contract growers are not the owner of the product, but are compensated for their land, building, labor and some small part of the production cost.

For integrators, the inability of producers to meet the technical requirements of contracts, quality problems, disputes related to payment and other contract terms, and ex-post contract negotiation are primary concerns and sources of risk.

Some conditions can outweigh the advantages of contract farming. In contractual arrangements, the role of the integrator firm is so important as it determines contract terms (most of the production and marketing practices and measures). Therefore, the efficiency of the firms' activities directly affects the efficiency of contract farming. The first step in successful implementation is establishing a sound organizational body in the contractor firms. Contracts could vary from company to company, but all of them must have a special unit dealing with all contractual issues equipped with necessary personnel and equipment. Also, its relationship to the other functions of the firm must be determined clearly.

It is recommended that there should be an independent organization to resolve disputes between

firms and farmers, which are the major causes for failure in contract farming. Solving disagreements and disputes between producers and processors created long delays while going to court. Thus, an arbitration and/or a reconciliation system would be useful by involving government and non-governmental representatives.

One of the clear findings of the case studies for Turkey and the USA is that the fewer and larger processors have created a monopsonistic, anti-competitive market structure. Having title of the product's (broiler industry) market information and production know-how as well as large market shares strengthened their position in the market against farmers. If we assume that packers or processors are closer to retailers and consumers, they have better market information than producers, this gives them bargaining power. In such structures the individual farmer is in a weak position at the bargaining table.

Antitrust oversight and related legislation may be seen as the first attempt to cope with the anti-competitive effects created by processors (integrators). The necessity of such attempts are not deniable, but it is a fact that it is not possible to control and regulate economic systems in every case.

One possible alternative for farmers is to forge alliances among producers and to establish processing and marketing cooperatives as in Turkey and the USA. These directly assure access to available markets and enhance net returns. Availability of producer cooperatives in the market as an alternative also creates a countervailing power when facing the corporate monopsonistic behavior. It was observed in beet-sugar industries both in Turkey and the USA that vertical integration of some processing companies by growers had real efficiency consequences.

Another significant way of strengthening farmer's bargaining power is the establishment of bargaining cooperatives as in the USA. Organizing a bargaining cooperative among farmers make them rather powerful in contractual relationships. Such an organization could also give an opportunity to collaborate with the integrators' organization. The producers and processors could act together. For example, California Tomato Growers Association needed to take a more active role in controlling imports. This led to the formation of National Association of Growers and Processors for Fair Trade. This attempt was successful in imposing regulation on imports and in other aspects, such as market development, political action, and making adjustments to consumer demand.

While the role of the government is an important factor for successful implementation, it is not possible to establish a comprehensive contract model via legislation

which has strict rules due to the existence of tremendous variety of enterprises in agriculture. Instead, the government could determine a framework for the contracts and enact regulation to solve disputes and take part in arbitration or a reconciliation group.

The most direct way for the government to address production contract issues is to regulate them specifically. Both in Turkey (national level) and in the USA (some states), governments have begun to regulate contract relationships either by establishing requirements or by requiring that legal disputes go through mediation before one party can take the issue to court. Governments can also require annual reports by contractors to gather more information about contracting and they can require registration or certification of certain entities that engage in contracting. For instance, licensing enables the government to control the use of certain practices more directly and to require the use of standardized contracts.

Government can also use indirect methods to encourage or facilitate contract producers' abilities to organize and bargain for more favorable contract terms as in some States of the USA.

In addition to the general conclusions summarized above, some specific measures could be proposed to have a more industrialized and vertically coordinated agro-food system and a well functioning contract farming in Turkey.

- There is a need for more comprehensive empirical studies (commodity level) to better model the structure and related problems of vertical coordination and contract farming.
- Collecting nation-wide data related to the different aspects of contract farming should be included in the General Agricultural Census as in the USA.¹⁰
- Government resources used in ineffective ways such as for price support, input subsidy and selective credit policies should be devoted to establishing a sound marketing and processing infrastructure through organizations which are owned and controlled by the producers.
- Available Agricultural Sale Cooperatives should be rearranged so that the producers have control of their cooperatives. That is, the direct involvement of the government in such organizations must be replaced with indirect support policies.
- Wholesale markets for the fresh fruits and vegetables must be reorganized. The structure of the present Commodity Exchanges must be changed by the

¹⁰ The Bureau of Census began collecting information about contracts in a sample survey following the 1959 Census of Agriculture in the USA.

establishment of futures markets as in the USA.

- Instead of privatization of the present food processing State Economic Enterprises, especially in the backward regions of Turkey, these should be reorganized as producer owned firms through cooperative or stock companies.
- Government policies regarding tax, credit, agricultural insurance and especially extension, must be evaluated to create a convenient environment. For instance, in US, the marketing orders have been strengthening the farmers' position in the contractual relationships.
- Both producers and integrators have to improve their understanding and attitude about contracts and contractual relationships. Each has to be informed about the legal and technical issues related to contract farming through efficient government extension programs.

Finally, it can be concluded that **contractual relationships are not only a distinctive feature of highly industrialized agro-food systems, but also a way for establishing an industrialized structure.** In the developing countries such as Turkey, contract farming should be evaluated as a way to provide easier access to credit, inputs, information, technology, and product markets for small scale farmers. Contract farming also contribute to development of a sound food industry.

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Table 2.1. Predicting the Organizational Form of Vertical Integration

		Task Programmability			
		Low		High	
		L. A. Specificity	H. A. Specificity	L. A. Specificity	H. A. Specificity
Non-Separability	Low	Spot market	Long-term contract	Spot market	Joint venture
	High	Relational contracting	Hierarchy	Inside contract	Hierarchy

Source: Mahoney, 1992, page 576.

Table 2. 2. Governance Structures and Transaction Characteristics

		Investment characteristics		
		Nonspecific	Mixed	Idiosyncratic
Frequency	Occasional	Market Governance (Classical Contracting)	Trilateral Governance (Neoclassic contracting)	
	Recurrent		Bilateral Governance	Unified Governance
			Relational Contracting	

Source: Williamson, O.E., 1979, page 253.

Table 3.1. Size Distribution of the Food Processing Firms

Size Category (Employees)	1983		1987		1991		1996	
	Number	%	Number	%	Number	%	Number	%
10-24	6	0.9	3	0.5	12	2.1	705	52.2
25-49	310	50.3	300	48.4	262	44.9	294	21.8
50-99	142	23.1	124	20.0	111	19.0	125	9.3
100-199	65	10.6	97	15.6	86	14.8	101	7.5
250-499	60	9.7	53	8.6	64	10.9	68	5.0
500- 999	16	2.6	24	3.8	35	5.9	45	3.3
1000+	17	2.8	19	3.1	14	2.4	12	0.9
Total	616	100.0	620	100.0	584	100.0	1350	100.0

Source: TR, State Institute of Statistics, Annual Manufacturing Industry Statistics, 1983, 1987, 1991, 1996.

Table 3.2. Size Distribution of Food Processing Plants

Size Category (Employees)	1963		1987		1992	
	Numbers	%	Numbers	%	Numbers	%
1-19	23 411	62.4	10 895	52.9	11 469	55.1
20-49	6 862	18.3	3 731	18.1	3 569	17.2
50-99	3 365	9.0	2 337	11.4	2 147	10.4
100-249	2 768	7.4	2 236	10.9	2 139	10.3
250-999	1 024	2.7	1 260	6.1	1 317	6.3
1000- +	96	0.3	124	0.6	157	0.7
Total	37 521	100.0	20 583	100.0	20 798	100.0

Sources: J. M. Connor and W. A. Schiek, 1997, page 85, and Bureau of the Census, 1992 Census of Manufactures, Table 1-4.

Table 3.3. Contract Production and Vertical Integration in the USA Food Industry

Commodity	Contract Production		Vertical Integration	
	1970	1990	1970	1990
Livestock				
Broilers	92	92	7	8
Turkeys	60	65	12	28
Hogs	1	11	1	6
Sheep/lamp	7	7	12	28
Field crops				
Food grain	2	7	1	1
Feed grain	1	7	1	1
Specialty crops				
Processed vegetables	85	88	10	9
Fresh vegetables	21	25	30	40
Potatoes	45	55	25	40
Citrus	84	70	9	8
Other fruit and nuts	20	35	20	25
Total farm output	28.2	30.5	5.3	7.6

Source: S.W. Martinez and Al Reed, 1996, page 5.

Table 3.4. Number of the Dairy Cooperatives by 1992-1997

Cooperatives	1992		1997	
	Number	%	Number	%
Processes and manufacturing co.	86	32.5	63	27.8
Milk receiving stations	44	16.6	25	11.0
Bargaining cooperatives	135	50.9	138	61.2
Total	265	100.0	226	100.0

Source: K.C.Ling, 1999.

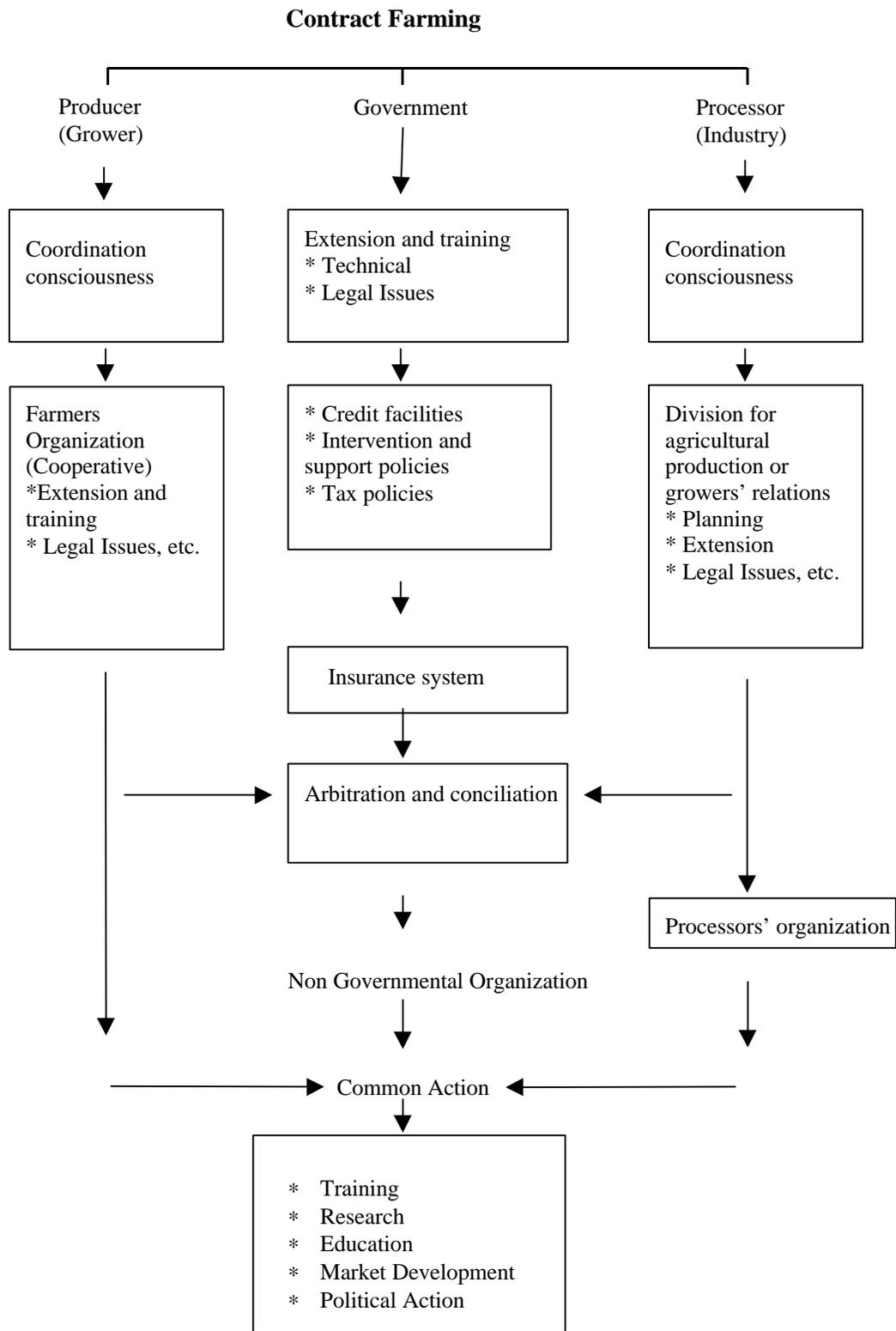


Figure 4.1. Structure of Contract Farming

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