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A SUBSECTOR OVERVIEW OF THE GUATEMALAN BEAN INDUSTRY: CONSTRAINTS AND OPPORTUNITIES FOR VERTICAL COORDINATION AND SUSTAINABLE GROWTH

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A SUB SECTOR OVERVIEW OF THE GUATEMALAN BEAN INDUSTRY: CONSTRAINTS AND OPPORTUNITIES FOR VERTICAL COORDINATION AND SUSTAINABLE GROWTH

By

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ABSTRACT

A SUB SECTOR OVERVIEW OF THE GUATEMALAN BEAN INDUSTRY: CONSTRAINTS AND OPPORTUNITIES FOR VERTICAL COORDINATION AND SUSTAINABLE GROWTH

By

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Conventional wisdom highlights the inherent benefits to farmers, derived from the growth of the food industry, by providing a new outlet for their crop. However, Guatemala's success in expanding bean processing, it has not benefited bean producers. Production, and per capita consumption of beans have declined by 30% in the last fifteen years, while the bean canning industry import most of its bean supply. Several possible reasons have been offered to explain this phenomenon. First, absence of coordination, opportunism, and high transaction costs. Second, generalized distrust against intermediaries. Third, inexistence of long-term relationships between producers and intermediaries. Finally, high quality standards set by the bean canning industry. By applying the subsector approach, as presented by Staatz in 1997, as a framework for analysis, this study found that poor adoption of improved varieties, reduced the access to credit, weak institutional framework and non-competitive markets have constrained the profitability of bean production. Thus, the apparent decrease in bean production is the result of a reduction in commercial bean farming, which has been offset by production at household level, not detectable through the government's conventional data collection techniques. In addition, this study concludes that given the price advantages of the international bean markets, coordination among producers and the canning industry is not a yet a viable alternative.

DEDICATION

To the three most influential persons in my life:

My parents, Rodolfo and Ligia Estrada, and

My grandfather, Gregorio Estrada

Thanks for introducing me to the love of God, to honesty and integrity,
and the satisfaction that only results from hard work.
Thanks for making me sensitive to the pain of others and intolerant to injustice, for fostering in me a solid social consciousness and a strong desire to comply with the moral obligation to promote change.

Most important of all, thanks for your unconditional love.

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CHAPTER ONE

INTRODUCTION

1.1 Background

As in most low-income countries, Guatemala's agricultural sector is a major contributor to the economy, accounting for 24% of GDP, 55.9% of total exports and 58% of the total labor force (Bank of Guatemala, 2000).

For several decades, most initiatives to promote agriculture have focused on staple crop production, in response to governmental incentives to guarantee food security. However, since the early 1980s, Guatemala has significantly increased its exports of non-traditional agricultural products (NTAP), including specialty fruits and vegetables, as well as spices, live plants and cut flowers[1]. This phenomena has contributed to increasing export earnings from $ U.S. 1,200 million in 1980 to $ U.S. 2,560 million in 1998 (AGEXPRONT, 1999), which has compensated for export earning losses caused by significant decreases in the international price of traditional crops such as coffee, cotton and bananas.

Despite the growing importance of NTAPs, beans (*Phaseolus vulgaris L.*) continue to play an important role in Guatemala's socioeconomic dynamics. First, beans --the second most important staple after corn--are grown predominantly by small farmers who cultivate less than 7 hectares. Specifically, 43.4% of the national bean supply is produced on farms of less than 7 hectares, 18.8% on farms from 7 to 45 hectares and 27.8% on farms greater than 45 hectares. Second, bean production generates an estimated 33,000 full time jobs, valued in more than $ U.S. 23 million. Third, bean production contributes to insuring the food security of low-income households in the

rural areas, who produce their beans to supply their consumption requirements. Finally, beans are the main source of protein for the poor, who do not have access to substantial amounts of animal protein, and are a traditional food for the rest of the population (PRONACOM, 1999).

Guatemala has a long history of conducting bean production research. Since the early 1970s, the Institute for Agricultural Science and Technology (ICTA) has developed 28 new varieties of beans, many of which not only incorporated new traits (*i.e.* disease and drought resistance), but also produce higher yields than traditional varieties. Nonetheless, only 15 of these varieties have been multiplied and distributed to farmers. Furthermore, farmer adoption of these varieties has been low (49%, 1995). Thus national yields average only 531 Kg/ha (1999).

Guatemala's agricultural sector is extremely bimodal. About 82% of all arable land is concentrated in the hands of 0.05% of the population (MAGA, 1996), which indicated that there exists a high level of inequality among social classes. Therefore, small farmers, who represent a large percentage of the total population, farm on marginal land, characterized by acute slopes, thin topsoil and limited access to water resources.

Among bean producers, farm size has often found to be inversely correlated with levels of technology used in the production process. According to MAGA (1996), farms smaller than 7 hectares account for 66.3% of the total bean producing area. In contrast, 7 to 45 hectare farms account for 15.6% of the area, and farms greater than 45 hectares account for only 18.2% of the total bean producing area. For the same period, bean yields on farms above 45 hectares were 48% above those of farms below 7 hectares (USPADA/MAGA, 1997).

Until the early 1970s, beans were treated as a commodity, with no priority given to value added transformation. Bean processing was first undertaken in 1974, when the canning industry incorporated beans into its line of products. Since then, the bean canning industry has grown rapidly, due to both increasing demand by higher income consumers who value the convenience associated with processed products and a strong export demand for Guatemalan canned beans in the U.S.

Currently, four firms can beans, in addition to several other product lines. While the production of canned beans has grown considerably during the 1990s (*i.e.* 12% per year), this expansion has not benefited Guatemalan bean farmers. FAO data indicate that dry bean imports have also followed an upward trend during the same period, which suggests that the bean processing industry has been increasingly relying on imported dry beans, rather than procuring beans from domestic sources.

1.2 Problem Statement

Agricultural economists argue that the development of agro-industry benefits farmers by creating a new market for their output. However, despite Guatemala's success in expanding bean processing, this phenomena has not benefited bean farmers. A recent competitiveness study (PRONACOM, 1999) reported that while total sales of canned beans grown rapidly, imports are believed to account for nearly 80% of the industry's dry bean supply.

Several possible reasons have been offered to explain the bean canning industry's high dependence on imported supplies. First, Ministry of Agriculture (MAGA) officials noted that an absence of coordination and opportunism are common characteristics of the

bean market in Guatemala, due in part to individualistic behavior of most agricultural producers, dispersion of production, lack of adequate means of communication and absence of reliable market information.

Second, bean producers often view intermediaries as a threat to their economic survival, since in the past middlemen have used private information to the detriment of producers and consumers. On the other hand, small farmers have a tendency to not value space, form and time utility provided by these economic agents.

Third, in the majority of cases, there exist no long-term relationships between producers and intermediaries or assemblers. The occasional character of these relationships reduces the opportunities for coordination and, as a result, opens the door to opportunistic behavior and high transaction costs that reduce the profitability of bean production (*i.e.* most producers deal with different traders every year). Since traders are not interested in developing a relationship over time, they generally extract the highest possible rents from the negotiation, in the form of excessive discounts for quality failures (*i.e.* percentage of brokens, high moisture content and weight), and use private information on prices and market trends to the detriment of producers.

Finally, processing firms require bean producers to meet high quality standards for dry beans (*i.e.* a maximum of 2% of broken beans, 15% moisture content, and zero impurities) that can only be achieved by producers who are organized in farmers' associations and cooperatives, since only these producers have access to drying, cleaning and storage facilities. This condition effectively excludes small and dispersed farmers from negotiating supply contracts with bean processors. On the other hand, as argued by

domestic producers, processing firms purchase low-quality dry beans in international spot markets, which is inconsistent with their requirements for domestic procurement.

These characteristics of the bean subsector--which tend to reduce farmers' profitability and increase uncertainty--reduce the incentives for farmers to expand production and invest in new technology. According to MAGA, it also encourages households to produce beans to meet their own requirements (food security), rather than relying on the market.

During the past three years, the Government of Guatemala (GOG) has attempted to promote growth in the bean subsector by encouraging greater coordination between organized domestic producers and the processing industry. However, these efforts to promote vertical coordination and reduce transaction costs have been seriously constrained by strict quality standards imposed by processors, lack of coordination among producers, and high production costs--which makes it more attractive for processors to import beans rather then to procure them locally.

1.3 Justification of the Study

Since the 1960s, several governmental and non-governmental organizations have conducted extensive research on beans within the Guatemalan context, including Universidad de San Carlos de Guatemala (USAC)--the country's leading agricultural university--and the Institute for Agricultural Science and Technology (ICTA), the national agricultural research institute. However, most research has focused on farm level techniques, developing new varieties, and enhancing nutritional value, while neglecting the themes of marketing, the processing industry, and its links with the institutional framework and public policies, on which this study focuses.

Since the late 1980s, total bean production has followed a decreasing trend due to a decline in cultivated area and yields (MAGA, 1998; PRONACOM, 1999). Since 1986, domestic production has decreased by 4.9% annually (MAGA, 1998), while population has been growing at a rate of 2.7% per year (FAO, 1999). While this implies a 30% reduction in domestic per capita availability over the 1986-1998 period, a recent study (INCAP, 1999) shows that despite moderate reductions in per capita consumption of beans, it has not decreased to such an extent. This finding indicates that the deficit in national bean supply has been supplemented by non-commercial household production which is often not included in official data. For example, Guatemala has not conducted an Agricultural Census since 1979, and official data do not report bean production by producers with plots less than 0.5 hectares.

Nevertheless, the low level of productivity in national bean production is becoming an increasingly important issue for agricultural authorities. In 2001, when the Trade Agreement of the Northern Triangle (Guatemala, El Salvador and Honduras) and Mexico goes into effect, Guatemala and other Central American countries will be required to progressively eliminate tariff barriers. In addition, within the Free Trade Agreement of the Americas (FTAA), whose negotiations must also be completed by 2005, Guatemala will be required to further reduce its tariffs. Once this point is reached, agricultural competitiveness will play an increasingly important role in determining the survival of several productive sectors, included the bean subsector.

Finally, the Central American Alliance for Sustainable Development, which has been endorsed by the chiefs of state of the region, gives special attention to establishing a

favorable business environment in order to attract foreign investments to support the growth of industrial sectors linked to agriculture, as engines of development.

In order for the Guatemalan bean subsector to remain competitive in the future, new strategies will be required to increase the subsector's productivity. Thus, an analysis of the factors constraining productivity growth in the bean subsector--including the institutional and regulatory framework of the bean processing industry--constitutes a key point of departure for identifying policies that are needed to stimulate the bean subsector.

1.4 Research objectives

The purpose of this study is to gain a better understanding of the current structure, coordination mechanisms and institutional framework of the bean subsector, with special focus on the bean processing industry, in order to determine its potential, constraints for future growth, and policies required to relax these constraints.

1.4.1 Specific objectives

The specific objectives of this study focus on the key dimensions of the bean subsector, which ultimately will determine the potentials and limitations for its sustainable growth. They are:

1. To provide an overview of the historical *evolution of the bean subsector*.
2. To determine the current *structure of the industry*, as well as the mechanisms and levels of coordination among the actors within the production, processing and distribution chains.

3. To document the *current 'state' of the bean processing industry*, its potential and constraints that limit its future growth, including the policies and institutional factors.

4. To analyze the existing *problems of coordination* between producers and processing firms, including a) the relative advantages of international spot markets in bean procurement for Guatemalan processors, compared to domestic contracting; b) the degrees of coordination between processing firms and small, large, organized and individual farmers; and c) the possibility of inducing tighter coordination between producers and processors.

5. To propose public *policy recommendations* that need to be implemented at the micro, sectoral and macro levels, in order to promote sustainable growth in the bean subsector.

1.5 Organization of the Thesis

The thesis is organized into five chapters. Chapter Two introduces the Research Design and Methodology, including description of research methods, list of interviews, description of research instruments used and the analytical approach that guided the study.

Chapter Three provides a general overview of the national context, including a general description of the country, its economy, the agricultural sector and the importance of beans within the national context.

Chapter Four provides an overview of the bean subsector, including a description of the actors involved in value adding activities (*i.e.* farmers, assemblers and traders;

wholesalers and the processing industry). It also describes the market structure in terms of levels of coordination among actors and sources of transaction costs, and analyzes the institutional constraints that limit the growth of the subsector.

Chapter Five presents a summary of the study, highlights policy recommendations derived from the analysis, as well as limitations of the study, and proposes priorities for future research.

Summary

Beans are the second most important food crop in Guatemala. In addition to being an important source of protein--especially for low income households--bean production accounts for more than 33,000 full-time jobs, valued in more than $. U.S. 23 million. Beans are widely grown by small farmers--43.4% of the national bean supply is grown on farms with less than 7 hectares, 18.8% on farms from 7 to 45 hectares and 27.8% on farms greater than 45 hectares.

Because of the strategic importance of beans, since the 1970s the Guatemalan government has sought to increase productivity by providing funds to support bean research at both the governmental agricultural research institute (ICTA) and the agricultural university. However, although ICTA has released several improved varieties, bean production has declined since 1986. Farm size has been found to be inversely correlated with the levels of technology used in bean production. In 1996, 66.3% of the total area planted to beans was grown on farms below 7 hectares, while 15.6% was grown on farms from 7 to 45 hectares, and 18.2% on farms greater than 45 hectares. For the

same period, bean yields of farms above 45 hectares were 48% above yields of farms below 7 hectares.

To date, bean research has focused on increasing production, including the evaluation of cropping patterns, crop associations, rates of fertilization, chemical control of pests and diseases, and varietal improvement. As a result, socioeconomic research has been neglected excluding consumer preferences, the requirements of the industry, marketing institutions, the impact of policy, and the economics of bean trade in general.

Therefore, this study uses a subsector approach to better understand the underlying economic relationships of bean production, marketing and processing, the role of government policies in promoting growth of the bean subsector; and the prospects for increasing the competitiveness of bean production, as will be required, given the challenges that will be introduced through new trade agreements which will come in force in the following five years.

CHAPTER TWO

RESEARCH DESIGN AND METHODOLOGY

2.1 Analytical approach

This study was designed to provide insight needed by decision-makers to introduce improvements in the institutional and regulatory frameworks, in order to facilitate the sustainable growth of the bean processing industry. It also analyzes the current structure and performance of the Guatemalan bean subsector, with special emphasis on issues related to coordination and sources of transaction costs. Therefore, this thesis employs the subsector approach, as presented by Staatz in 1997, as a framework for analysis.

The subsector approach has been used extensively as a tool to conduct subject matter research. Shaffer proposed the original Subsector Paradigm (1973), as "the vertical set of economic activities in the production and distribution of a closely related set of commodities." The vertical set of activities under which a commodity gains value added includes input provision (including research), extension, farm level production, processing, storage, assembly, transportation, wholesaling, retailing, financing and consumption (Martel-Lagos, 1995).

Another reason for using the subsector approach is because it takes into account the relevance of the vertical and horizontal relationships within the system, including farm-level production activities and linkages to other economic activities (*i.e.* research, extension, trading, processing, etc.)

Although, the subsector methodology was originally considered to be lengthy, intensive and time consuming (Holtzman, 1986), in recent years economists have

developed a modified subsector approach which utilizes rapid appraisal techniques to generate an overview of the subsector. Although less comprehensive, this approach provides researchers with sufficient insights to a) identify key constraints in the subsector, b) prioritize research, and c) identify policy changes that are needed to facilitate sustainable growth.

2.2 Conceptual Framework

This study is guided by several interdependent economic concepts. This section introduces the concepts that will enable the reader to link economic theory to the issues addressed in the study.

2.2.1 Industrialization of agriculture.

Staatz (1997) notes three premises that are critical to understanding the process of structural change in the agricultural sector.

1. In order to be successful, future industrialization must be built firmly upon the links between agriculture and industry, exploit comparative advantages, and be conceived of in a systems context to take advantage of the synergies between agricultural and industrial development.
2. As the economy begins to exploit the gains from specialization and trade, more of the activities shift outside the household. Thus, separation between agriculture and industry begins.

3. Increasing productivity (and hence incomes) in the economy occurs either by rising the productivity of individual physical transformations (*e.g.* the introduction of new technologies), or by improving the coordination among the various productive activities.

2.2.2 Subsector approach

According to Staatz (1997), the subsector approach is simply a way of viewing a 'vertical slice' within the food systems matrix. It examines how production and distribution activities for a commodity are organized within the economy and asks how the productivity of those activities can be increased, either through improved technologies or better institutions and policies to coordinate various stages of production and distribution.

The subsector has been defined alternatively as "the vertical set of activities in the production and distribution of a closely related set of commodities" (Shaffer, 1973), or as "An interdependent array of organizations, resources, laws and institutions involved in producing, processing and distributing an agricultural commodity" (Marion, *et al*, 1986).

Therefore, a subsector can be viewed as both a) a set of activities and actors, and b) the rules governing those activities, giving the subsector approach a behavioral context.

Based on the above, descriptive and analytic tasks involved in carrying out a subsector analysis include:

1. Describing the current structure of the subsector, in terms of activities, actors and rules involved;
2. Explaining why and how this structure arose;

3. Analyzing the implications of the existing structure on the economic performance of the subsector; and
4. Analyzing possible forces of change affecting the subsector and their implications for subsector performance--forces that will influence the supply and demand conditions, including changes in government policies, institutions, technologies, shifts in the sources of supply of competing products, and the evolution of demand, both nationally and internationally.

Subsector analysis is guided by five key concepts (Staatz, 1997):

1. **Verticality.** A basic systems notion which means that the conditions at one stage in the subsector are likely to be strongly influenced by conditions in other stages of the vertical chain, often in indirect and unexpected ways.
2. **Effective demand**. Subsector analysis views effective demand as the pump that pulls goods and services through the vertical system. Therefore, the approach emphasizes:
    a. Understanding the dynamics of how demand is changing at both the domestic and international level (including the evolution of different niche markets), and the implications of that evolution for subsector organization and performance; and
    b. Examining possible barriers to the transmission of information on the changing nature of demand back to actors at each level of the subsector.

3. **Coordination within channels.** Much of the subsector analysis involves analyzing how well current market, contract, vertical integration, or other types of arrangements harmonize and coordinate the activities of different actors within the subsector. Among other things, this analysis involves examining the implications for how these arrangements affect who bears the risk in the system and what incentives exists for the different actors in the subsector to invest in improving the productivity of the system.

4. **Competition between channels.** A given subsector may often involve more than one marketing channel. Subsector analysis attempts to understand competition and examine how it may be modified to achieve better economic performance.

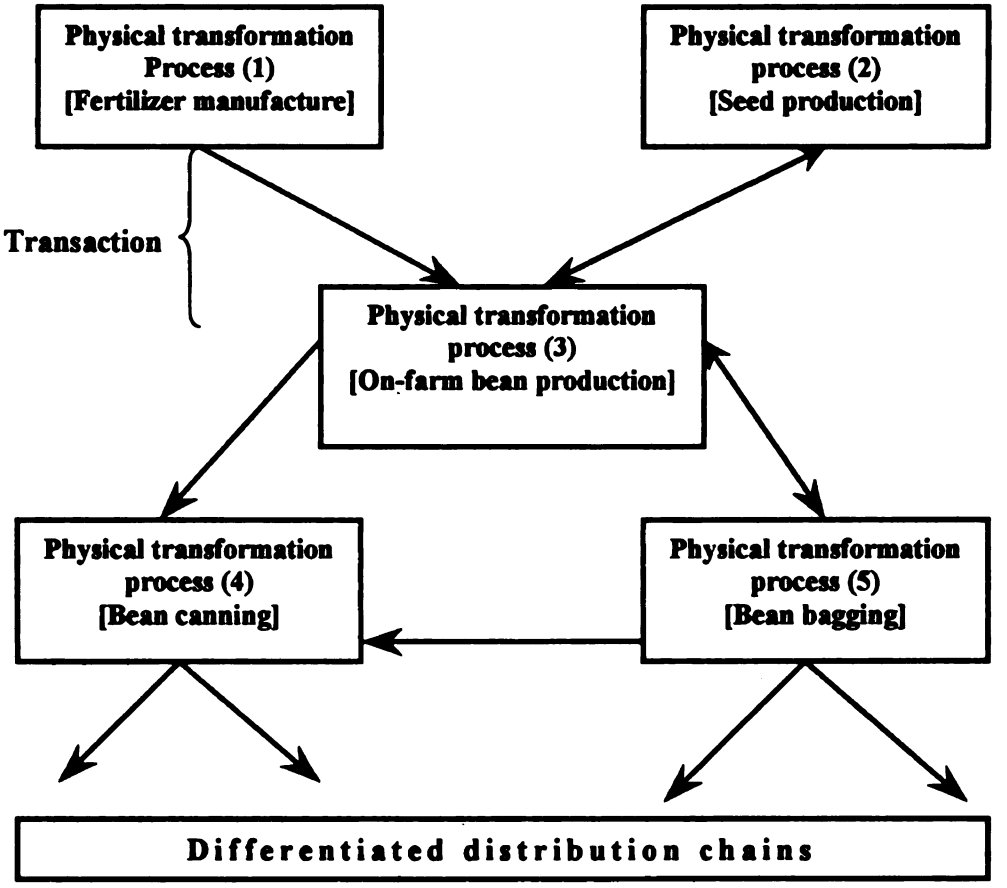
5. **Leverage.** Particularly where a large number of small firms (or interest groups) are involved, it may be very costly to develop public actions that seek to help each firm individually. Therefore, subsector analysis seeks to identify key nodes in the production-marketing sequence where actions can help a large number of firms at once.

In order to gain better insight of the implications of subsector analysis, we should, at this point introduce the concept of Production-Distribution-Consumption sequence (PDCS), which has two basic dimensions: a) physical transformations and b) transactions. Physical transformations are the result of combining two or more inputs to make and output. Transformations are linked to transactions. For each

technologically separable transformation in a PDCS, potential transactions exist for passing outputs from one activity to another.

With each separable transformation, specialization is possible. In theory, each separate transformation can be handled by a separate individual or group of individuals. These various groups are linked by transactions, which can take place within firms or across markets, as specialization can take place within firms of between them (Figure 1).

Figure 2. 1 Nodes in a PCDS[1]



2.2.3 Transaction Costs

Transaction costs are the costs associated with carrying out a transaction. They are usually regarded as "friction" in an economic system, which tend to reduce exchange. In this sense, "market failure" is simply a case of prohibitively high transaction costs. Based on the part of the production process where they arise, transaction costs can be classified as *ex ante* transaction costs (*i.e.* cost of gathering information for a potential transaction, costs of processing information, costs of coming to a decision); or *ex post* transaction costs (*i.e.* cost of monitoring performance, and costs of enforcing agreements and contracts). Note that the origin of all transaction costs is human interdependence, in the sense that they arise only when people have to work together to benefit from specialization of trade, in order to capture economies of size in new technologies. However, it is often difficult to clearly separate transaction costs from other production costs.

Three major factors that affect transaction costs are:

1. **Uncertainty.** The greater the level of uncertainty surrounding a transaction, *ceteris paribus*:
   a. The less efficient and the more costly it is to rely on spot markets to mediate the transaction.
   b. The greater the incentive to move to some form of contracting or integration.

   De Janvry and Sadoulet (1995) argue that markets for inputs and outputs (including food) in developing countries are highly risky due to the thinness of the market and fluctuating supply and demand. Also, transaction costs associated with

[1] Adapted from Boughton, *et al*, 1987

using markets in developing countries are high, since in most cases they lack grades and standards and there is poor enforceability of contracts. As these conditions combine to discourage specialization and its gains, households remain integrated in a very diverse set of activities.

This, in turn, increases transaction costs by encouraging small lots of highly dispersed production and small lots of individual products. This results in high per-unit assembly costs and local markets that support only a few traders, which can lead to monopsony and, hence, high transaction costs. Because a lack of specialization often leads to poverty, these conditions both show potential gains to market reforms, if markets can be made more reliable in these countries, and the limits to such reforms, unless one focuses on the basic sources of uncertainty in these markets.

2. **Externality principle** The greater one party to a transaction can impose intended or unintended externalities on another party, the greater the incentive to move from spot markets to some other structure, such as contracting or vertical integration (Williamston, 1985).

3. **Asset specificity** The greater the transaction involves assets that are specific to a particular transaction, the less likely the transaction-specific use is greater than its use in alternative activities (Klein, Crawford and Alchian, 1978). Asset specificity can arise from specialized use, site-specific use, or temporal factors (*e.g.*, due to perishability of the product produced by the asset).

Incentive for non-spot market transactions arises from the tendency of at least one party to a transaction to act opportunistically to try to appropriate the quasi-rent

generated by his partner's specialized assets (Klein, Crawford and Alchian, 1978). This expropriation can result in the hold up problem[2] and moral hazard.

The transaction cost approach has four main applications in agricultural economics (Williamson and Masten, 1995):

a. Explaining types of governance structures that are likely to arise in situations involving certain types of transactions.

b. By focusing on asset specificity, this approach helps to explain the rigidity of certain institutions and the unwillingness of some to adapt to changes in the market.

c. Helping to guide the design or redesign of food system institutions, by looking at the nature of the transactions and the types and degree of mutual dependence that arise in different types of transactions and their implications for appropriate institutions to mediate transactions, and

d. Analyzing how changes in technology may affect transaction costs and, hence, the most appropriate governance structure.

2.2.4 Coordination

Mighell and Jones (1963) introduced the concept of vertical coordination as a process, defining it as "the ways of harmonizing the vertical stages of production and marketing". Marion, *et al.* (1986) describe vertical coordination as a state, conceptualizing it as "The sufficiency of the system of prices and other mechanisms as carriers of information and incentives and directors of the allocation of resources in a subsector".

[2] Situation in which producers loose bargaining power due to asset specificity (*i.e.* specialized use, site specificity, perishability, etc.)

Vertical coordination is part of the marketing systems continuum, which goes from spot markets to vertical integration (factors of production under the same property scheme). In the case of agricultural products, it includes several different levels (*i.e.* marketing agreements, marketing contracts, production contracts, *etc*). Based on economic theory, tighter forms of coordination are expected to result in lower transaction costs and, hence, higher efficiency. For this reason, vertical coordination is a key strategy for improving market efficiency in low-income countries.

Thus, the marketing system is a primary mechanism for coordinating production, distribution, and consumption activities. It will include the exchange activities associated with the transfer of property rights to commodities, physical handling of products and the institutional arrangements for facilitating these activities (Harrison *et al*, 1987).

2.3 Subsector overview

A subsector overview of the bean industry in Guatemala was conducted during July 2000. As previously mentioned, it focused on determining the structure and performance of the bean subsector, with special emphasis on the institutional and regulatory framework, as well as issues related to coordination and transaction costs. To achieve these objectives, existing secondary data were compiled and analyzed, and personal interviews were conducted with several actors within the system in order to better understand the dynamics of the subsector, including government officials, farmers' associations, bean farmer cooperatives, assemblers and traders, wholesalers, packing firms, bean processing firm managers, and retailers.

2.3.1 Research methodology

As a first step towards the identification of key informants, a list of actors within the system was prioritized, guided by the objectives of the study. The geographic area to be sampled was also determined, based on the regional distribution of bean production.

As a result of the above, the area of study, population and sampling methods were determined. The geographic area for the study was delimitated as the departments of Jutiapa, Jalapa and Chiquimula (out of 22), since according to the Ministry of Agriculture (MAGA), these three departments account for 43.3% of national production and 36.9% of the land area devoted to beans. In addition to government officials, the key informants were from among members of the following groups:

2.3.1.1 Farmers' associations

The population of farmers' associations within the study area was defined as groups for whom more than 50% of their total production was beans. The sample size for this group was set at ten associations (Jalapa 3, Jutiapa 4, and Chiquimula 3). These 10 associations constituted 75% of the total number of bean-producing farmers' associations that met the above defined criteria within the study area. The leaders of all ten associations were invited to participate two one-day workshops, in order to exchange impressions around the issues that are the focus of the study.

While the sample of associations was not selected at random (*i.e.* it included associations that were willing to provide the requested information), the

participants were representative of the populations of farmers' associations within the target area.

2.3.1.2 Assemblers and traders

As there existed no list of commercial traders, the total population was estimated through interviews with leaders of farmer organizations. Of the 24 traders identified, a total of six were selected for interviews, which corresponds to 25% of the population of large-scale assemblers and traders (*i.e.* business purchasing more than 40MT/week during the harvest season) in the departments of Jutiapa, Jalapa and Chiquimula. Given the difficulty of locating these traders, the first six (2 per department) traders who were contacted were interviewed, either in their hometowns or in their unloading points in the capital city. All the traders who were contacted agreed to be interviewed.

2.3.1.3 Wholesalers in Guatemala City.

Guatemala City's 16 large-scale bean wholesalers are clustered around two areas within the city. Because these wholesalers are highly secretive about their trading activities and potentially hostile towards strangers, the sample size was limited to the first 6 who were contacted (37.5 of the total population of wholesalers). All wholesalers contacted agreed to provide the requested information.

2.3.1.4 Packaging firms.

Packaging firms, commonly known as *baggers*, place beans in plastic bags for retail in supermarkets and small stores. Five firms include beans among their

products, all of which are located in the capital city. Three of these firms agreed to be interviewed, corresponding to 60% of the bean baggers[3]. None of them declined to be interviewed.

2.3.1.5 Processing firms.

The bean processing industry in Guatemala produces canned refried beans, usually as one of a long list of canned products (*i.e.* fruit cocktail, jalapeño peppers, tomato paste, and others). Four firms include beans within their line of products, and all four were contacted and interviewed.

2.3.1.6 Retailers

A survey of retailers (supermarkets, grocery stores and "corner stores") was also conducted in order to determine the approximate market share held by each of the four firms' brands of canned beans. A set of retailers (composed of a supermarket, a grocery store and a corner store) was selected in each of three neighborhoods of Guatemala City (*i.e.* low-income, medium-income and high-income). In addition to assessing the shelf-space provided for each brand of canned beans, interviews were conducted with the manager of each retail stores.

2.4 Research instruments

Since the study involved the collection of primary data from the above-described actors within the bean subsector, five interview guides were designed prior to initiating the study. These instruments were revised in the field, based on suggestions from local professionals and government authorities.

[3] Participatory methodology to analyze the Strengths, Opportunities, Weaknesses and Threats to a particular activity.

In the case of bean processing firms, an interview guide plus a set of open ended questions were used to provide an opportunity to obtain better insights regarding issues of interest to the researcher, rather than a standardized questionnaire. In addition, each firm was asked to provide a common set of statistical data about their operation.

The set of research instruments encompassed the following five guides:

1. Interview guide for farmers' associations
2. Interview guide for bean traders
3. Interview guide for bean wholesalers and baggers
4. Statistical questionnaire for bean processing firms
5. Interview guide plus open ended questions for bean processing firms

After all suggestions were considered and incorporated into the original interview guides and all five instruments were pre-tested, the workshops for representatives of farmers' associations were scheduled, as well as the meetings with representatives of the bean processing firms. In the case of processing firms a copy of both, the statistical questionnaire and the interview guide were sent via e-mail. These forms were provided in advance in order to allow the key informants sufficient time to compile the statistical information and to provide them with a rough idea of the subjects to be addressed during the personal interview.

A total of 47 representatives of farmers' organizations attended the workshops, which were held in Jutiapa on July 14, and in Chiquimula on July 20th, both from

09:00 to 16:00. Initially, the researcher made a presentation introducing the objectives of the study. Afterwards, representatives of farmers were asked to comment about their own experiences with respect to the issues noted in the interview guide.

In order to provide a systematic framework for data collection and joint analysis with the participants, a modified SWOPF[3] approach was implemented, yielding an "x-ray" of the limitations and potentials of the agricultural phase of bean production. This approach allowed the researcher to discuss with all representatives issues related to the structure of the bean subsector, its strengths and limitations, as well as their valuable opinion regarding policy alternatives. It also provided a unique opportunity to gain better insights related to the farmers' year-to-year struggle in an activity that encompasses a great deal of uncertainty. The researcher's concerns about the presence of a high degree of opportunism, adverse selection and moral hazard in the side of assemblers and traders were also confirmed.

The personal interviews with managers and CEOs of the processing firms, as well as with traders and wholesalers, took place during the first and last weeks of July. Traders were interviewed as they were visited, since the researcher felt that making a previous contact by any means would have reduced the likelihood that they would agree to be interviewed.

Summary

Based on our primary interest of analyzing the structure and performance of the bean industry (including the actors that participate in the value-adding processes, from agricultural production to sales and distribution of final products) and the scarcity of

time, a modified subsector approach, was used to collect data required to describe the subsector and the underlying economic relationships among actors. This overview also provided information required for economic and policy analysis.

The research was guided by economic theory associated with marketing institutions, transaction costs, competition and vertical coordination. This theoretical background both served to structure the research framework and subsequent analysis.

The field study was carried out in the departments of Jutiapa, Jalapa and Chiquimula (out of 22) since, according to the Ministry of Agriculture, these three departments account for 43.3% of national production, and 36.9% of the area devoted to bean production. As such, these departments include most of the surplus bean producers in the country.

Field research activities included conducting personal interviews and surveys of government officials, farmers' associations, bean farmer cooperatives, regional assemblers and traders, wholesalers in Guatemala City, bean processing firms (packing and canning industries), grocery stores and supermarkets. The sample size varied by type of respondent, including 47 leaders of 10 farmers' organizations, six assemblers and traders, six wholesalers in Guatemala City, three packing firms, and four canning firms. In addition informal interviews were carried out with managers of three supermarkets, three grocery stores and three "corner stores" in the capital city, in order to update previous data on market shares and relative competitiveness of canned beans.

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CHAPTER THREE

THE NATIONAL CONTEXT

3.1 Guatemala

Guatemala is located in the northern section of Central America. It borders North and West with Mexico, east with Belize, the Atlantic Ocean and Honduras, and South with the Pacific Ocean. It has an area of 108,889 square kilometers (approximately 42,000 sq. miles, and slightly smaller than Tennessee) (INE, 1961).

Figure 3.1 Political Map of the Republic of Guatemala and the Study Area (shaded).

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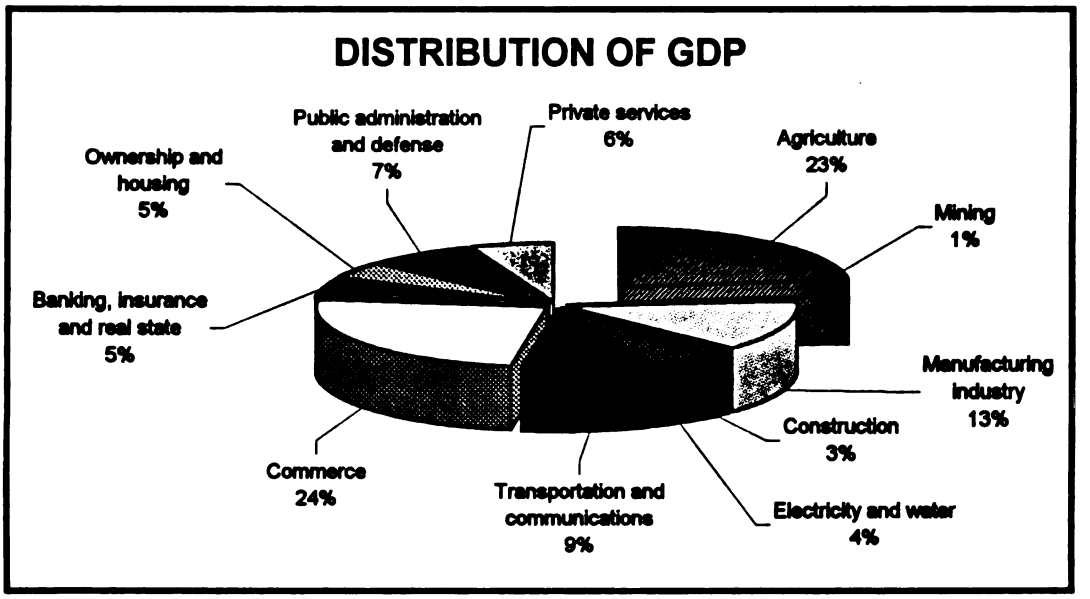
3.2 Economy

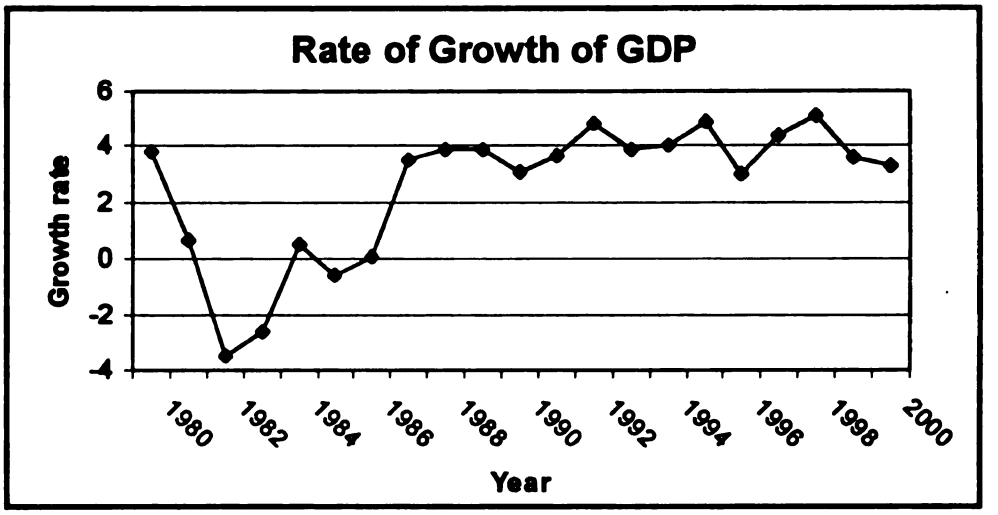
Guatemala's gross domestic product (GDP) reached $ U.S. 4.9 billion in 1999. Commerce accounts for 24.7% of GDP, followed by agriculture with 21.3%, and industry and manufacturing with 13.6%, as shown in Figure 3.1 (BANGUAT, 2000). Guatemala's GDP per capita is estimated at $441 (1999).

Figure 3.2 Intersectoral Distribution of GDP (BANGUAT, 1999)



Growth of GDP has followed an erratic trend characterized by high volatility, which experts attribute to continuous changes in macroeconomic policy (Figure 3.2). The national currency (Quetzal), which until 1982 was pegged at a one-to-one relationship with the U.S. Dollar, suffered it most recent depreciation in 1999, losing 13% of it value (Edwards, 2000). Thus, at the time of the study the exchange rate was Q7.70=$U.S. 1.00. According to key informants in the Guatemalan private sector, the current exchange rate reflects the real value of the national currency and promotes the growth of the export industry, although it also increases the cost of production of products which use imported inputs.

Figure 3.3 Rate of Growth of GDP. Guatemala, 1980-1999



Source: BANGUAT

3.3. The Social Context

The Guatemalan population is estimated at 11.09 million. Approximately 60% live in the rural areas, while the remaining 40% reside in urban centers, including Guatemala City, with an estimated population of 2.5 million. The labor force is estimated at 4.0 million (36% of the population), out of which 71% is male.

An estimated 61% of Guatemalans live under the poverty line, mainly due to lack of equity in the distribution of wealth, which is particularly evident in the rural areas (ECLAC[1],1999).

Not only has the lower strata of the population lacked access to factors of production, but a large percentage of farmers do not posses land titles, which automatically disqualifies them for credit from financial institutions, thereby constraining economic development. According to conservative estimates, 61% of farms lack titles (PAFG/FAO, 1997). According to a recent study, these were some of the factors that led

[1] Economic Commission for Latin America/United Nations Organization

to the civil war that took place from 1960 to 1996 (CEH, 1999), in which civil casualties exceeded 150,000. However, to address this problem, in 1996, the GOG began to implement a long-term program to provide land titles, with the aid of geographic information systems, which is scheduled to be completed in 2008.

In addition, in an effort to better address the needs of the poor, the GOG has implemented several economic, educational, public health and social development initiatives, investing more than $200 million/year (FONAPAZ, 1999).

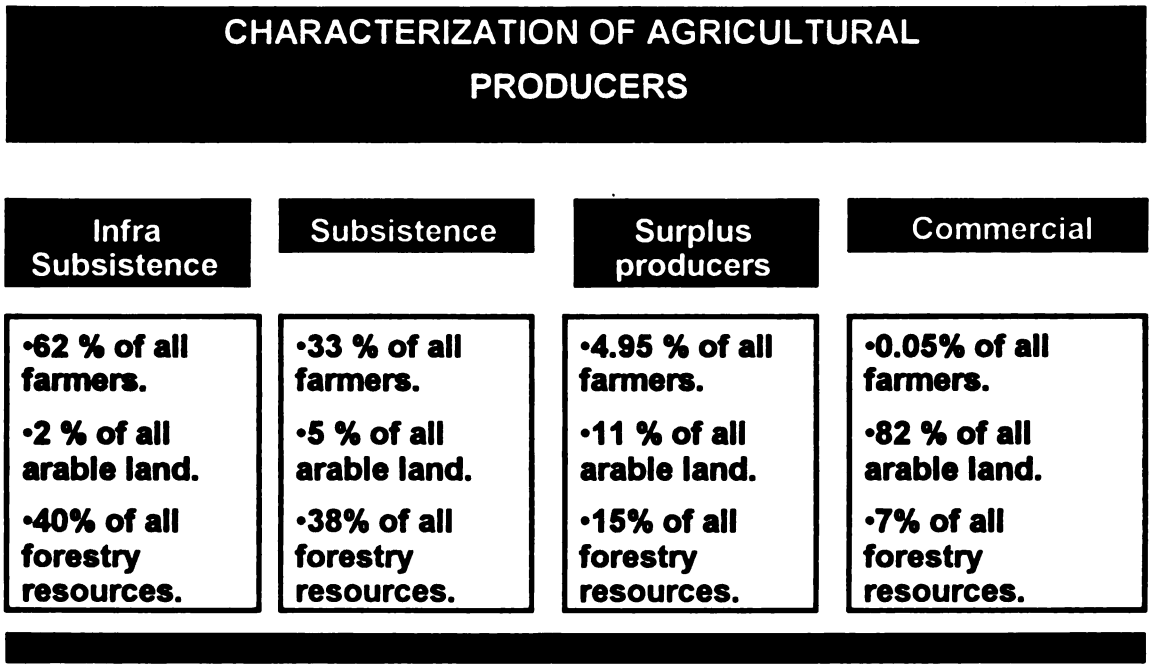
3.4 The Agricultural Sector

Historically, Guatemala's agricultural sector has produced staple crops such as maize, beans and rice for domestic consumption; and export products such as coffee, bananas, sugar, cotton, cardamom and lately fresh fruits and vegetables for the U.S. and European markets, to generate foreign exchange.

Seen solely from the economic point of view, the agriculture is the second most important sector in terms of its share of GDP. However, when analyzed from the social and economic standpoints, it acquires singular relevance. The agricultural sector accounts for not only 24% of GDP, but also for 58% of the labor force and 55.9% of export earnings. However, the agricultural sector is characterized by large inequities. According to the "Agricultural Policy framework" (MAGA, 1996), a large percentage of land is in possession of a reduced percentage of the population, which has contributed to the expansion of small-scale agriculture on marginal lands and an important factor in depletion of forestry and soil resources (PAFG/FAO, 1992).

According to resource experts (PAFG/FAO, 1996), the negative correlation between farm size and the allotment of forestry resources (Figure 3.2) has promoted the use of forest as an *economic refuge* for the rural poor.

Figure 3.4 Current Distributions of Land and Forestry Resources (MAGA, 1996)



Source: Framework for Agricultural Policy, Ministry of Agriculture, 1996.

The agricultural sector accounts for 55.9% of all exports. Traditional exports include coffee, bananas, cane sugar, and cardamom. According to key informants at the Non Traditional Products Exporters Association (AGEXPRONT), the country's deficit in foreign currency has resulted from a downward trend experienced by traditional agricultural products. However, in recent years grow in non-traditional exports (including high value fruits and vegetables, cut flowers, handcrafts and wood furniture, with a high proportion of value added) have generated an increasing share of agricultural-based foreign exchange. The main markets for such products are the U.S. England,

Holland, France, Germany and Japan. According to AGEXPRONT, in 1999 non-traditional exports accounted for more than $. U.S. 1,215 million, equivalent to 47% of export-based earnings, compared to $. U.S. 629 million (31%) in 1990.

3.5 Crop production

Staple crops include maize (*Zea mays*), beans (*Phaseolus vulgaris*), and rice (*Oryza sativa*), Table 3.1. Most farmers grow maize and black beans, as part of their strategy to guarantee food security. Nevertheless, there are certain regions in the country with favorable agro-climatic conditions for the commercial production of both crops. Thus, maize is grown in commercially in the southern part of the country, and beans are grown commercially in the eastern part of Guatemala (*i.e.* departments of Jutiapa, Jalapa and Chiquimula), which account for 43.25% of the national bean production (Table 3.2). In contrast, rice is mainly grown as a commercial crop in the northern part of the country.

Table 3.1 Comparative Analyses Among the Main Staple Crops. Guatemala, 2000.

Year	Beans		Maize		Rice	
	Area ('000 ha)	Production ('000 MT)	Area ('000 ha)	Production ('000 MT)	Area ('000 ha)	Production ('000 MT)
1990	129.99	118.18	634.48	1,272.24	14.28	44.43
1991	144.13	112.29	668.71	1,233.25	16.52	47.49
1992	140.00	114.56	725.62	1,366.38	15.54	40.44
1993	120.89	99.69	699.65	1,294.78	17.43	47.65
1994	134.65	91.39	606.92	1,187.69	12.93	38.81
1995	121.16	90.12	546.20	1,061.58	10.97	30.58
1996	121.38	79.56	575.13	1,046.79	11.81	21.36
1997	122.78	72.68	576.17	860.94	11.83	21.94
1998	133.19	83.59	628.91	1,068.78	13.59	30.69
1999	135.22	93.30	626.62	1,109.12	15.05	38.69

Source: FAO, 2000

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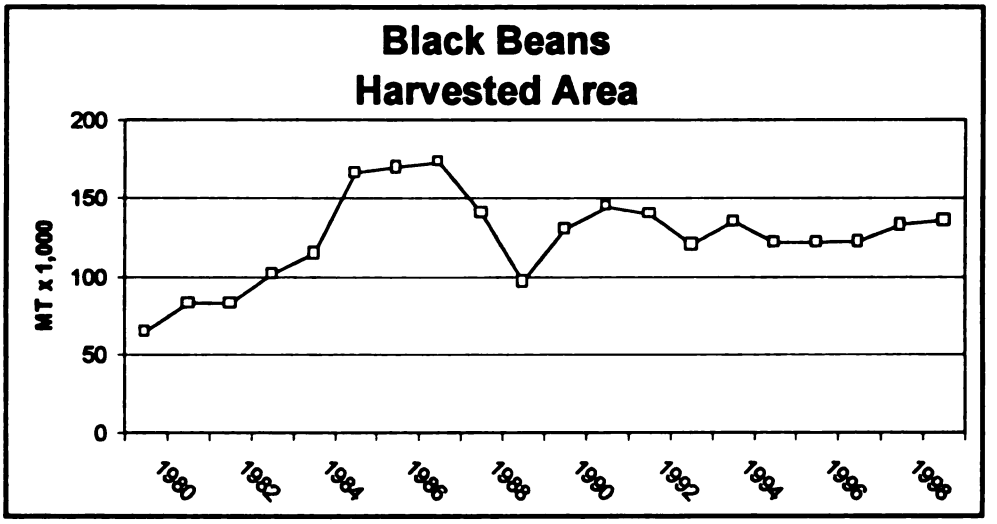
3.5.1 Bean Harvested Area and Production

From 1980 to 1986, the bean area increased from 60,000 to 160,000 has. However, the bean area fell sharply from 1986 to 1998 (100,000 has), and has fluctuated from 135,000 to 150,000 since 1990 (Figure 3.4). In 1999, the harvested area in beans stood at an estimated 135,220 has (MAGA-FAO), with 43.3% of beans grown in the departments within the study area. About 17% of farmers in this region grow beans as a commercial crop (MAGA, 1996).

Figure 3.5 Beans, Yearly Fluctuations in Harvested Area 1980-1999.



Source: Ministry of Agriculture

Table 3.2 Geographic Distribution of Bean Production. Area Harvested and Production by Department, Guatemala (1999).

Department	Area ('000 Has)	Production ('000 MT)	Percentage of National Production
Jalapa	23.75	14.33	15.36
Quiché	16.44	2.78	2.98
Petén	16.05	14.80	15.86
Huehuetenango	15.39	3.71	3.98
Chiquimula	15.00	17.87	19.15
Jutiapa	11.63	8.15	8.74
Sacatepéquez	6.39	3.91	4.19
Guatemala	5.48	6.53	7
Zacapa	4.98	5.93	6.35
Santa Rosa	4.17	4.97	5.33
El Progreso	2.90	1.73	1.86
Chimaltenango	2.69	0.54	0.58
Alta Verapaz	2.50	2.76	2.96
Baja Verapaz	1.82	1.44	1.55
Izabal	1.59	2.79	2.99
Sololá	1.39	0.11	0.12
Totonicapán	1.26	0.18	0.19
Quetzaltenango	1.08	0.30	0.32
San Marcos	0.58	0.35	0.37
Escuintla	0.12	0.11	0.12
Retalhuleu	0.01	0.00	0
Suchitepéquez	0.00	0.00	0
TOTALS	**135.22**	**93.30**	**100.00**

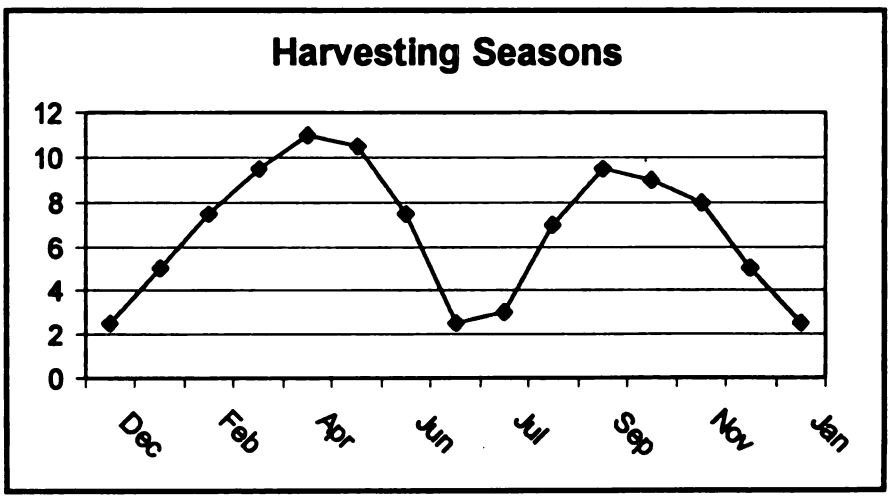
Source: Ministry of Agriculture, 1999.

3.5.2 Bean Growing Seasons

In the eastern region of the country (the study area) and in the northern department of Petén, where bean production also has a commercial focus, there are two well-differenced growing seasons (i.e. *primera* and *Segunda*). In contrast, in the rest of the country--particularly in the central and western highlands--there is only one growing season, due in part to the 'the marginality of lands' and unfavorable environmental conditions (*i.e.* at high altitudes the biological cycle of beans can extend beyond 5 months).

In the study area, the harvest seasons follow the standard pattern, with about 60% of yearly output coming from the first crop (*primera*), and the remaining 40% from the second crop (*Segunda*) (Figure 3.4).

Figure 3.6 Harvesting Seasons (*"Primera"* and *"Segunda"*), as Percentages of Total Production, Guatemala 2000.



Source: UPIE/Ministry of Agriculture

3.6 Beans in the Guatemalan Diet

Beans are consumed throughout Guatemala, with no substantial regional variation with respect to their relative importance in the diet. A large percentage of rural households (79%) grow their own beans (MAGA, 1987), while the supply of beans for urban households comes from surplus production in the rural areas. Empirical data show that the market shares of canned beans, as well as influence of packaged beans (i.e. 1, 2 & 5 lb. bags) are increasing[2]. Estimated market shares (2000) of bagged beans and canned beans were 17% and 1.38% respectively. The estimate of canned beans was made based on dry weight (total domestic supply divided by the average industrial conversion rate of 3.5 lb of refried beans per pound of dry beans).

Beans are the second most important food staple in Guatemala and the rest of Central America. In terms of nutrient value, beans contribute 92 calories/person/day and 6g/person/day of protein, which makes them the second most important source of protein after corn (Martel, 1995).

3.6.1 Consumer preferences

Consumer preferences for beans in the Guatemalan market are mainly driven by color and cooking time. Guatemalan consumers eat black beans on regular basis, and red and white beans only when preparing certain regional recipes. Thus, black beans account for more than 97% of total bean production (MAGA, 1995).

[2] Key informants among bean packing firms provided data to which indicates that sales of canned beans has been growing at an average of 4.5% per annum since 1996.

Cooking time varies according to variety and storage time, which most influences cooking time. Thus, in order to obtain a premium price for their new crop, farmers tend to leave it mixed with leaves and dirt as an indication that it has not been stored, since in order to store beans in a silo or in sacks, they need to be free of impurities.

Key informants reported that a positive characteristic of some varieties is their ability to produce a "thicker" soup, which--according to plant breeders at ICTA--is due to a higher content of solids. However, for consumers that purchase their beans at local markets and corner stores, it is a matter of "luck" to obtain beans with these preferred characteristics, given that it is virtually impossible to trace the source of beans or to discriminate among varieties.

3.6.2 Home Preparation

Beans are primarily consumed in three different forms: bean soup, refried beans, and blended beans. Despite their final form, all recipes include preparing bean soup as a first step. In general, beans are eaten as a separate dish, without mixing them with rice or meat, as is done in other Central American countries.

Complements for beans include corn tortillas, rice and bread; as well as cilantro, garlic and onion, which are added in the cooking process. Once cooked in a soup, they are mashed and then fried in vegetable oil or lard to make refried beans, or blended and seasoned to make a thick soup. In all cases, the main companion of beans are corn tortillas, followed by white bread in the capital city. As a timesaving strategy, it is a common custom to cook large amounts of beans and using them throughout the week.

Green beans (fresh immature pods) are consumed as a side dish. However, their consumption is highest in urban centers, since they tend to be associated with Spanish and international cooking.

Most consumers in rural areas and urban centers purchase unpacked beans. However, according to key informants in the bean packing industry, in the capital city the market for packed beans is increasing rapidly. According to the same source, the growing demand for packaged beans is due in part the greater female participation in the labor force. In the past, a large percentage of women did not work outside the household and the task of cleaning beans prior to cooking them (on a daily basis) was a social ritual. While women used to clean beans while listening to a radio show or watching a soap opera, now, with a larger percentage of women employed outside the household, the opportunity cost of their time is higher. Thus, since they have less time available to cook, packaged beans are becoming a convenient product for households who cannot afford to purchase canned beans. Further analysis of the bean packing and bean processing industries is provided in Chapter Four.

3.7 Demand Analysis

Domestic supply (domestic disappearance) of beans is calculated by the following formula:

$$S_b = (P_b + I_b) - (Ex_b + S_b + St_b)$$

Variable	*Description*	*Variable*	*Description*
S_b	Supply of beans	P_b	Total production
I_b	Imports	Ex_b	Exports
S_b	Seed use	St_b	Storage losses

Domestic availability (calculated in basis of domestic disappearance) has followed a downward trend over the last 10 years. This trend was particularly pronounced in the periods from 1992 to 1994, and from 1995 to 1996, when the rates of change in domestic availabilities and consequently per capita consumption were -27.69% and -7.61%, respectively (Table 3.2). *Per capita* consumption has declined steadily since 1985, at an average rate average -4.08% per year (Figure 3.6). These data are consistent with a priori knowledge regarding the substitution of commercial bean production by production at household level in order to offset the potential threats to food security derived from price fluctuation.

Table 3.3 Total and Per Capita Bean Availability (domestic disappearance) Guatemala 1990-1999.

Year	Production ('000 MT)	Imports (MT)	Exports (MT)	Seed (MT)	Storage losses (MT)	Domestic supply ('000 MT)	Population ('000)	Kg/capit
1990	118.18	2,039	2.0	6,630	6,011	107.6	8,749	12.3
1991	112.29	4,050	63.0	6,440	5,821	104.0	8,976	11.6
1992	114.56	5,345	13.0	5,561	6,000	108.3	9,214	11.8
1993	99.69	1,700	67.0	6,194	5,070	90.1	9,460	9.5
1994	91.39	2,613	267.0	5,573	4,700	83.5	9,714	8.6
1995	90.12	1,347	431.0	5,583	4,574	80.9	9,976	8.1
1996	79.56	2,201	917.0	5,648	4,088	71.1	10,244	6.9
1997	72.68	2,193	1,086.0	6,127	4,208	63.5	10,519	6.0
1998	83.59	2,293	1,275.0	6,220	4,681	73.7	10,801	6.8
1999	93.3	4,300	870.0	6,256	5,318	85.2	11,090	7.7

Source: FAO/MAGA

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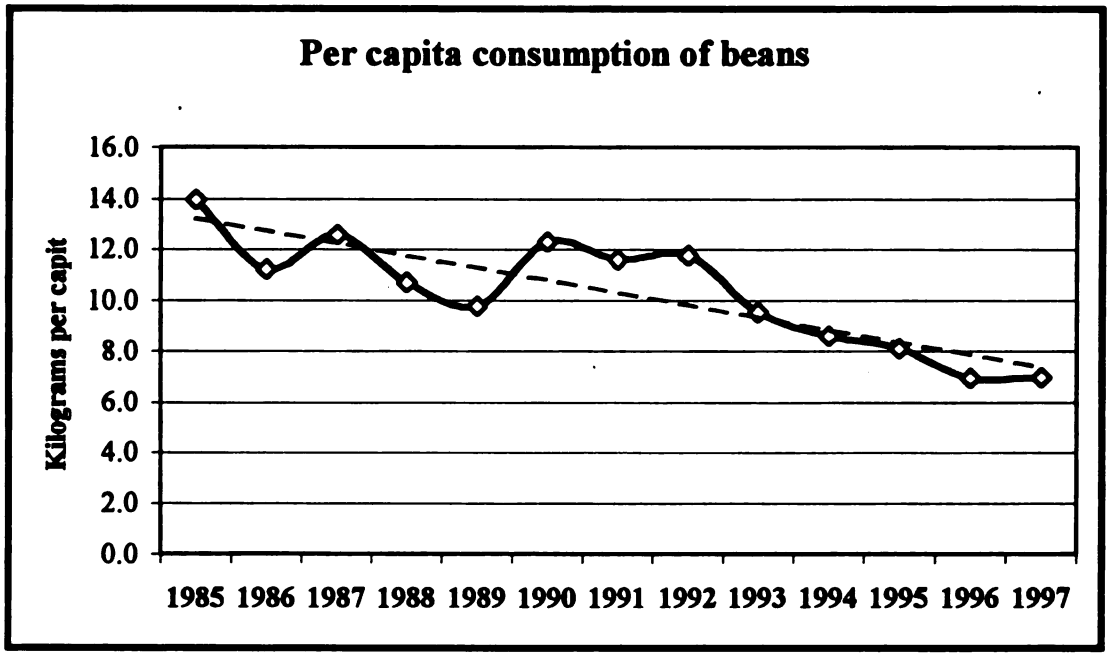
Figure 3.7 *Per Capita* Consumption of Beans. Guatemala, 1980-2000



Source: FAO/MAGA

3.8 Summary

The Guatemalan economy is highly dependent on agriculture, as it accounts for 21.3% of GDP (estimated in $. U.S. 4.9billion for 1999), which makes of agriculture the second most important sector after commerce (24.7%). Population is estimated in 11.09 million. Approximately 60% of the population lives in the rural areas, while the remaining 40% reside in the urban centers, including Guatemala City. The labor force is estimated in 4.0 million, or 36% of the total population.

An estimated 61% of Guatemalans live under the poverty line, mainly due to a lack of equity in the distribution of wealth, which is particularly evident in the rural areas.

Access to credit for agricultural purposes is an important constraint for the expansion of agricultural production. An estimated 61% of farmers do not posses land titles, which automatically disqualifies them for credit from financial institutions.

As part of the Peace Accords, (December, 1996), the Guatemalan government directed more than $ U.S. 200 million per year to social investments, in an attempt to raise the standards of living of rural communities. In a parallel fashion, the Ministry of Agriculture is implementing a land-titling program, which is expected to provide legal titles for most farms by year 2,008.

The agricultural sector is oriented towards the production of three types of crops: a) staple crops (maize, beans and rice), b) traditional agricultural exports such as coffee, bananas, sugar and rubber, and c) non-traditional exports. The latter have become increasingly important over the last 15 years, accounting for 47% of agricultural exports in 1999.

From the food security standpoint, maize and beans are the most important crops, as they are the main sources of calories and protein for low-income households. Both crops are grown mainly by small farmers throughout the country. However, surplus bean production is concentrated in the departments of Jutiapa, Jalapa, Chiquimula, which account for more than 43% of total production.

According to MAGA, 79% of rural households grow at least part of their bean supply, while partially relying on local purchases. In contrast, urban household fully depend on dry and canned beans purchased from supermarkets, stores and market vendors. Sales of beans sold in 1, 2, and 5 pound packages, as well as canned beans have followed an upward trend over the last decade, presumably due to an increasing

number of women in the labor market, which has constrained their time available to prepare food.

Nevertheless, according to official data, bean availability has steadily declined at a rate of –4.08 per year since 1985, which at first sight appears to indicate a considerable decrease of per capita consumption. However, as we will see in following chapters, changes in production patterns could offer an explanation to this phenomenon.

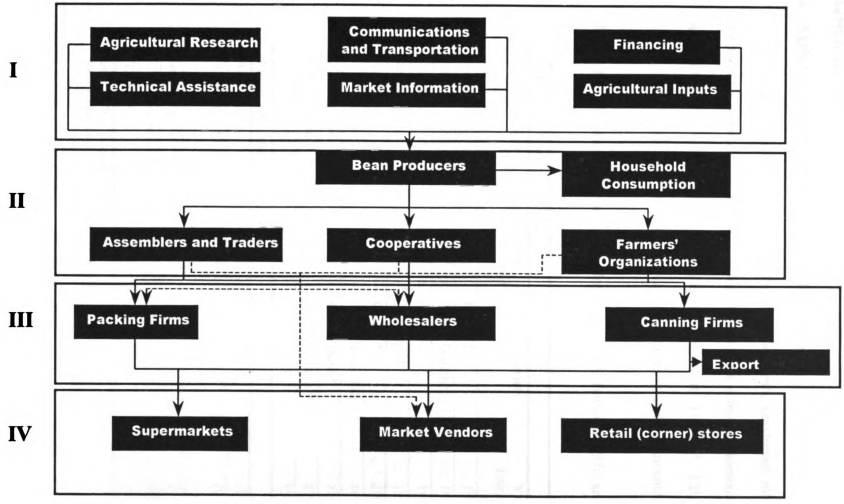
CHAPTER FOUR

OVERVIEW OF THE BEAN SUBSECTOR

4.1 Structure

For the purpose of this study, the bean subsector will be divided into four major levels: 1) support services, 2) agricultural production, 3) wholesaling and processing, and 4) Retailing. The first level *(support services)*, involves several actors, including agricultural research organizations, agrochemical and seed distributors, suppliers of irrigation equipment and materials; transporters, and banks and private lenders. The second level *(agricultural production)* consists of rural households, cooperatives, farmers' associations and assemblers or traders who transfer beans from producers to the industry and to retailers in the urban centers. The third level *(wholesaling and processing)*, includes wholesalers in the capital city, and bean packing and canning firms, whose outputs are dry beans packed in one hundred-pound-sacks, in polyethylene bags and canned (refried) beans, respectively. Finally, the fourth level *(retailing)* includes actors involved in retail sales, like supermarkets, market vendors and small retail stores, also known as 'Corner stores'.

Figure 4.1 Subsector Map and Levels of Analysis



4.2 *Level I, Support Services*

4.2.1 Agricultural Research and Technical Assistance

Since the 1970s, agricultural research has been, conducted mainly by *Instituto de Ciencia y Tecnología Agrícolas* (ICTA), a semi-autonomous central governmental financed agency, with close links with USAID[1], CIMMYT[2], CIAT[3], and PROFRIJOL[4] and other research and development organizations.

Table 4.1 Improved Varieties Developed by ICTA Between 1970 and 1999, Guatemala.

Eastern Cultivar (lowlands)			
Variety	**Year Introduced**	**Variety**	**Year Introduced**
Porrillo 70	1970	Ipala 72	1972
San Pedro Pinula 72	1972	Negro Jalpatagua 72	1972
Cuilapa 72	1972	IAN 2824	1975
Jamapa	1975	Turrialba 1	1977
Suchitán *	1977	Culma *	1977
ICTA Quetzal *	1979	ICTA Tamazulapa *	1979
ICTA Jutiapan *	1979	ICTA Ostua *	1985
ICTA Chapina *	1989	ICTA Monjeña *	1989
ICTA Sta. Gertrudis *	1991	ICTA Ligero *	1998
Western Cultivar (Highlands)			
IAN 5091	1970	Guate 10261	1970
Compuesto Chimalteco 3	1970	Chile 23 (red)	1970
San Martín VB *	1978	ICTA Quinack Ché *	1984
ICTA Parramos	1984	Altense *	1985
TEXEL *	1986	Hunapú *	1990

Source: ICTA. August, 2000
*** Varieties released, multiplied and sold to farmers.**

[1] United States Agency for International Development
[2] International Center for the Improvement of Maize and Wheat
[3] International Center for Tropical Agriculture
[4] A regional bean research support funded by Swiss Aid.

According to data provided by ICTA, from 1970 to 1999 the institution developed 28 improved bean varieties (see Appendix A for a detailed description). However, only 14 have been multiplied and sold to farmers during the same period (Table 4.1). According to PROFRIJOL (1996), 49% of Guatemala's total bean-growing is planted to improved seeds. However, one of the insights gained from the workshops with bean farmers in eastern Guatemala was that only 32% of the total area in the region is planted to improved seeds. Considering that bean farmers in this region are among the highest adopters of technology, this suggests that the real rate of adoption (*i.e.* national average) is significantly lower that the rate reported by PROFRIJOL.

Scientists and agronomists interviewed at ICTA, MAGA, and local NGOs agreed that the main factor responsible for a low rate of adoption from 1970 to 1995 was weak linkage between research and extension. Until the early 1990s, the agricultural extension system employed more than 3,000 agricultural technicians. However, coordination between ICTA and the extension service was almost nonexistent. Since most farmers were not aware of the availability of improved varieties developed by government scientists, there was little effective demand for these varieties.

In the early 1990s, as result of reorganization, the Ministry of Agriculture was downsized from more than 19,000 to only 2,500 employees and agricultural extension was reorganized. To this end, the government encouraged small, medium and large agricultural producers to organize themselves into departmental-level producers' groups. Under the new organizational structure, a

delegate from every farmers' association is selected to represent his/her group at the departmental level, and these representatives constitute the *Networks for Sustainable Agricultural Development* (RADEAS). Thus, at the departmental level, the specific needs of farmers are centralized, prioritized and channeled to the Ministry of Agriculture for the allocation of funds. To support this initiative, MAGA provides funding to RADEAS, which distribute these resources among its member organizations who contract with local firms for technical assistance.

According to representatives of farmers' organizations, this new structure has allowed for direct exchange of information among governmental agencies and farmers, which has served to promote the introduction and adoption of improved varieties of beans and other crops (Table 4.2). In addition, alliances between ICTA and farmers' associations have facilitated the production and distribution of improved seed varieties.

Table 4.2 Improved Bean Seeds Distributed by ICTA During the Period 1997-1999 (lbs). Guatemala.

Variety	1997	1998	1999
Ostua	13,841	25,122	14,076
Sta. Gertrudis	19,934	89,452	3,455
ICTA Ligero	0	154,049	78,593
TEXEL	2,275	6,116	3,226
Hunapú	960	10,563	4,000
Altense	0	5,225	0
TOTAL	37,010	290,527	103,350*

Source: ICTA. August 2000

* According to key informants at MAGA, the observed decrease in seed production for 1,999 was due to damage caused to the seed crop by of Hurricane MITCH.

Currently, the government is considering providing government funding to universities in order to help them develop crop improvement programs. This approach is modeled on the successful experiences with the Non-Traditional Products Exporters Association, which has conducted applied agricultural research with government funds and charges its clients a fraction of the cost, according to a sliding scale (based on size of farm, income and payment capacity). However, internal contradictions and lack of political consistency[5] in MAGA are likely to prevent such initiative from becoming operational.

4.2.2 Transportation

The departments within the study area have a relative advantage in terms of transportation and communication infrastructure, compared with those in the northern part of the country (average road densities of 23.2 in the study area, vs. 3.5 kilometers of road per square kilometer in the north), as shown in Table 4.3. However, according to key informants, high transportation costs have direct effects on prices paid by traders. According to representatives of farmers' associations, producers in remote areas within the department of Jutiapa are paid discounted prices, based on the accessibility and quality of roads. Discounts vary from 5 to 10%, compared to prices paid to farmers who live close to a paved road.

[5] During the first year of the current presidential period, the Minister of Agriculture has been changed three times.

Table 4.3 Transportation and Communications Infrastructure in Eastern Guatemala (1998)

Department	Population	Area Km^2	Road density[a]	Telephones[b]	Electricity[c]
Jalapa	248,877	248,900	27.1	0.43	33.7
Jutiapa	369,691	369,700	19.2	0.55	51.8
Chiquimula	290,746	290,750	23.2	0.83	48.8

a. Kilometers of roads per 100 Km^2
b. Telephone lines per 100 inhabitants
c. Percentage of households with residential service
Source: PRONACOM, 1999

Interviewed farmers also reported that when they have tried to rent trucks to transport their crop to urban markets, they have been charged considerably higher rental fees, when the quality of the roads was poor. Thus, transportation remains an important source of transaction costs to bean producers.

4.2.3 Market Information

Access to market information is essential to all firms. In the case of agricultural production, access to accurate and timely information is more of a constraint to small farmers than to large agricultural firms. Typically, larger firms have greater access to information resources and innovative means of communication, which gives them a market advantage.

In the case of Guatemala, this is a key issue since large firms are linked to their headquarters in the city via portable VHF radios, and cellular networks. In contrast, small farmers usually travel to the departmental offices of the Ministry of Agriculture (MAGA), where they obtain market (wholesale and retail) prices

with a one-day lag. While this is usually a one to three hour trip, considering the erratic schedule of rural transportation services, it typically takes a whole day for farmers to travel to the department office and return home. Thus, only farmers' associations and cooperatives can bear the cost of obtaining up-to-date market information.

Before 1996, the only governmental office collecting market information was the National Institute for Agricultural Marketing (INDECA), a parastatal established in the mid-1960s with the main objective of stabilizing the prices of cash crops (corn and beans). While INDECA provided wholesale and retail price information during the period 1966-1996, it disregarded quality standards. As a result, most of these data were unreliable. According to MAGA officials, another important issue is the fact that until its termination, INDECA centralized all commercial information in their headquarters in Guatemala City, where bureaucracy was a serious problem. Thus, price data were not distributed in a timely manner.

In 1996, the MAGA adopted a new structure, and created eight operative units, including the Agricultural Policy and Strategic Information Unit (UPIE). The UPIE is divided into three strategic areas: a) a Policy Area, in charge of designing and conducting agricultural policy; b) a Strategic Information Area, in charge of keeping records of prices, estimating food balances, and as crop forecasting, and c) a Planning Area. Currently, price information is gathered three times per week, at both the wholesale and retail level, in all departments in the country. The data are transmitted daily via e-mail to UPIE headquarters,

where it is compiled, analyzed and distributed to departmental MAGA offices via a listserv.

Thus, all farmers and the general public can obtain market information with only a one-day lag. However, during the field research, most farmers' organizations expressed a concern that they had to travel to MAGA's departmental headquarters to obtain these data, which increased transaction costs. Therefore, they suggested that price information should be transmitted via AM radio on a daily basis. When asked about this issue, MAGA officials responded that this initiative is in their operative plan for FY 2001.

4.2.4 Financing

According to key informants in the Ministry of Agriculture, credit services for agricultural production are highly restricted by private banks, due to the high degree of uncertainty that surrounds agricultural activities, especially food crops, and the lack of certainty regarding property rights over agricultural land. Conservative estimates indicate that 61% of farms do not have land titles (PAFG/FAO, 1996). A few private banks, including the former Agricultural Development Bank (BANDESA) which was privatized in 1997 and renamed BANRURAL, provide financing to only a small share of bean producers (Table 4.4).

The lack of financial support not only for the production of beans, but for most cash crops, is a significant constraint to the growth of the subsector and makes small landholders dependent on traditional traders or assemblers, who in a large percentage of cases provide financial support in the form of cash advances.

Table 4.4 Financing of Bean Production 1985-1996, Guatemala.

Year	Harvested area	Cost of production [a-b]	Financed[b]	% of production cost
1985-1986	170,240	83,358,938	342,135	0.41
1986-1987	173,390	84,901,353	818,667	0.96
1987-1988	172,060	84,250,111	971,600	1.15
1988-1989	140,420	68,757,414	757,452	1.1
1989-1990	97,090	47,540,644	1,393,286	2.93
1990-1991	129,990	63,650,308	886,270	1.39
1991-1992	144,130	70,574,035	431,335	0.61
1992-1993	140,000	68,551,758	2,165,006	3.16
1993-1994	120,890	59,194,443	676,818	1.14
1994-1995	93,828	45,943,574	1036,751	2.26
1995-1996	134,243	65,732,722	1,309,944	1.99

a. The total cost of production was calculated from the cost of production per hectare (reported by BANRURAL) minus financial costs, multiplied by harvested area
b. Deflated according to the CPI reported by the National Institute of Statistics (INE)

For example, 47% of interviewed farmers reported that they usually sell their production to local traders who provide advances in cash and in-kind. However, the prices they charged farmers for fertilizers usually exceed the market price by 10-15%. In addition, farmers who received cash advances implicitly accept the fact that they will receive a discounted price for the beans they sell to these traders. According to interviewed farmers in Jutiapa, Jalapa and Chiquimula, local (private) lenders play a less important role nowadays, especially considering the fact that social capital links have weakened overtime with the growth of urban centers, reducing the opportunities for contract enforcement. As a result, 88% of informants had never used the services of private lenders, and none were currently using these services.

MAGA officials reported that in order to reduce uncertainty and expand access to financial services for producers of cash crops, the government is encouraging the creation

of agricultural insurance firms. To this end, a Mexican insurance firm is currently conducting a feasibility study. In addition, a land registry program in currently being implemented with the aid of geographic information systems, with the goal of providing land titles to all farms within eight years.

4.2.5 Agricultural Inputs

Agricultural inputs include seeds, insecticides, fungicides, herbicides, fertilizers, spraying equipment, irrigation materials and veterinary products. Within the study area, these products are generally sold by small private agricultural input stores called *'agroservicios'*; which are typically owned by graduates of vocational agricultural schools (high school level) or community leaders. In either case, in addition to selling agrochemical products, salespersons also provide free technical advise when asked. For these reasons, *agroservicios* have become a popular source of agricultural knowledge. An outstanding point is that despite the significant amount of social capital built over time between producers and salespersons at *agroservicios*, purchases are generally paid in cash (*i.e.* 90-95% of cases).

During the field research, eight *agroservicios* in the study area were visited. Although the selection of products was similar (*i.e.* 8-10 insecticides, 6-8 fungicides, 3-4 herbicides, 4-5 granulated fertilizers, and 5-8 foliar fertilizers), only three firms sold bean seeds, while six sold maize seeds. According to the store managers, they did not sell bean seed mainly because they have to travel to the capital city in order to purchase it. In addition, they reported that the demand was not significant (especially because farmers exchange improved seeds among themselves) and that marketing margins were not attractive.

Stores that sold bean seed sold it by the pound, although they bought seeds from ICTA in 50 pound-bags. Thus, package size was not a constraint. The seed price ranged from Q 4.25 to Q 4.75 / lb ($.56-$.62/lb)[6], and yearly sales per store ranged between 600-850 lbs. One store manager believed that the low level of effective demand for newly released varieties and consequently low levels of adoption was largely due to lack of information. In his own words: "farmers cannot demand something that they do not know exists".

4.3 *Level II*, Agricultural Production

4.3.1 Production Patterns

Bean production is carried out at two levels: a) production for household consumption, and b) commercial production. Within the study area, all interviewed farmers (47) were members of 10 farmer associations and all of them had surplus production of beans, a pattern that is consistent with *a priori* information regarding the geographic concentration of surplus producers. These farmers utilized modern technologies, including improved varieties (32%), mechanized plowing (36%), and chemical fertilizers and pesticides (100%). Farmer associations surveyed in the study area had 7,815 farmer-members.

Members of the surveyed farmer organizations grow 9,009 hectares of beans per year, and produced 40,350MT, equivalent to 6.7% of the total bean-growing area in the country and 13.02% of the national bean supply (1999).

[6] Price of beans at the time of the study were Q2.75/Lb, equivalent to $ U.S. 0.36

Farmers' yields ranged from 726 to 1,063 Kg/ha[7]. However, this figure should no be taken as representative of the national yields, as the study area has a superior potential for commercial bean production, as indicated by the difference between the region's share of the country's bean growing land and its production share. Cost of production are relatively consistent among these groups of farmers, averaging $U.S. 0.29/Kg (Std. Deviation = 2.85)[8].

Farmers in these three departments are familiar with the different types of agrochemicals and their specific uses and dosage, as well with the main pests and diseases of crops in the region. According to regional MAGA officials, this is the result of more than 30 years of intensive agricultural extension in the area.

Land Holdings

About 84% of association farmers owned from 1 to 5 hectares; 8.6% owned 5.1 to 8 hectares; 4% owned 8.1 to 15 hectares, and 3.4% owned more that 15 hectares. With respect to land titles, 70.2% had valid land titles; 17% had land titles in the name of an ancestor (which had not been validated), and the remaining 12.8% were *de facto* proprietors.

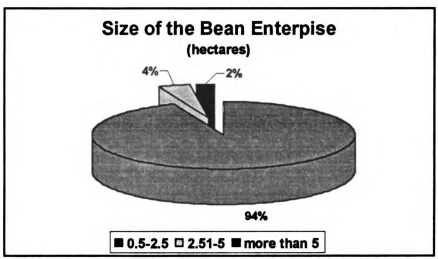
The bean enterprise

In the study area, beans are one of several farm enterprises. Farmers have two objectives: to produce beans both for household consumption and to obtain a marketable surplus of this highly demanded crop. In Jutiapa, Jalapa, and Chiquimula, most farmers also planted maize, onions, tomato, coffee, and raised

[7] Record keeping data from farmers' organizations.
[8] Calculated based on the associations' record keeping and validated through random sampling.

livestock. Among these farmers, their bean enterprise averaged 1.15 hectares, while 94% of these farms planted from 0.5 to 2.5 hectares of beans, 3.8% planted from 2.51 to 5 hectares, and 2.3% planted more than 5 hectares.

Figure 4.2 Size of the Bean Enterprise, Among Members of Ten Farmers Organizations in Jutiapa, Jalapa and Chiquimula, Guatemala.



Source: Field Survey of 10 Farmers' Organizations. July, 2000

Bean Surplus

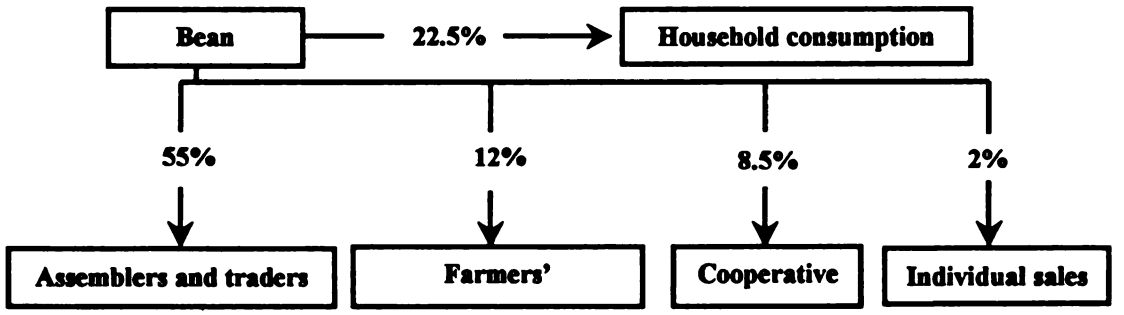
Because a large percentage of farmers in the region have a commercial focus (Figure 4.4) on average, these farmers marketed 77.5% of their bean harvest, selling their surplus to traditional traders, cooperatives, farmers associations and via sales individual to consumers in their communities. However, among these farmers, their marketable surplus ranged widely. About 57.4% sold 80-100% of their crop, 38.3% sold 60-79%, and only 4.3% sold less than 60% of their harvest.

4.4 *Level III* Wholesaling and Processing

4.4.1 Bean Wholesaling

Following harvest, marketed beans flow from the farm-gate through middlemen, who sell to wholesalers for resale at the retail level, or to processing firms. Farmers in the interviewed associations utilized several different marketing channels. Over one half (55%) of the association farmers marketed their crop through traders and assemblers, 8.5% through cooperatives, 12% through farmer associations, and 2% via individual sales to institutional consumers. (See Figure 4.2)

Figure 4.3 Distribution of Bean Output Corresponding to Members of Ten Farmer Associations in the Departments of Jalapa, Jutiapa and Chiquimula (Jun 2,000), Guatemala.



Source: Farmers' Associations Interviews, July 2000

Although some key informants reported that the share of total production that they retain to meet household demand was insufficient to meet their annual consumption requirements, some farmers (*i.e.* 17%) sold part of their consumption share in order to overcome cash constraints.

Assemblers and Traders

Local businesspersons (traders), who assemble beans within a specific area, are in reality *informal* economic agents. Since most of their transactions are not reported to fiscal authorities, there exists no record of their total number, name, or location.

Thus, in the departments of Jalapa, Jutiapa and Chiquimula where the study was conducted, it was necessary to interview leaders of farmer associations and cooperatives, as well as individual farmers, to determine the approximate population of traders. According to these sources, there were 24 traders who operated in the area and typically purchased at least 40MT per week during the harvest season. Six of these traders were interviewed, two from each of the three departments in which the study was conducted.

Traders in the region work exclusively with beans during the period from June to January, buying and delivering beans to the capital city and other departments in the western highlands from two to three times per week per truck. Five of the six traders who were interviewed had at least two trucks, with an average capacity of 10MT. In some cases, especially during the rainy season (May to October), traders used 4x4 pickup trucks to collect beans from surrounding villages, until they gather a full truckload.

All interviewed traders had rudimentary storage facilities, consisting of wood, adobe (clay blocks), or concrete rooms, which most of the times were adjacent to their homes. The capacity of these facilities ranged from 4 to 90 MT (avg. 43MT), which seems to be sufficient --especially considering that due to

constraints in cash flow, traders seldom store beans for long periods of time (mode of 6 days).

In most cases (93%), traders sold to wholesalers in the capital city and other cities in the western region of the country, from whom they often (30% of the times) received cash advances prior to every delivery.

On average, the six traders traders bought and sold 43.5 MT per week during the harvest season (Jun-Jan). According to calculations made, based on statistical data provided by MAGA, profit per MT averaged 12%, which at current prices in July 2000 represented $100/MT. However, according to the interviewed traders, their profits were considerably lower. While, none of them showed accounting records, a key informant reported that traders generally incurred significant expenses that are seldom accounted for in official estimates (*i.e.* donations to village fairs and other leisure activities).

Social capital plays an important and often unvalued role in the rural marketing systems. In the case of the bean market, assemblers reported purchasing a significant share of beans from their home villages (avg. 76%). Approximately 12% of the traders' transactions with independent farmers involved cash advances and 10% of purchases were made (at least partially) on credit. Thus, in the absence of appropriate contract enforcement mechanisms, social capital is the primary source of leverage for contract enforcement.

Farmer Cooperatives

Although farmer cooperatives were introduced into the country several decades ago, beginning in the early 1970s the number of cooperatives grew rapidly. Initially, the growth in cooperatives was directly supported by the GOG through the Ministry of Agriculture. Since the General Law of Cooperatives was enacted (1978), the National Institute of Cooperatives (INACOP) has been the governmental organization in charge of promoting, registering and auditing cooperatives. Nevertheless, according to data from INACOP, since the late 1980s there has been a decrease in the rate of formation of new agricultural cooperatives, due to their presumed association with guerrillas in the late 1970s and early 1980s, as well as widely known cases of corruption.

Out of the 10 farmer organizations interviewed during the field research, only three were farmer cooperatives: *Ipaljá, Agrijal,* and *Atescatel.* As shown in Table 4.5, in 1999 these three cooperatives accounted for 1,897 MT of beans, equivalent to 4.7% of regional production.

All of the cooperatives had storage facilities with a capacity ranging from 400 to 1,500 MT, and provided their members with marketing services. In the case of Atescatel, the cooperative also provided cleaning and polishing [9]

[9] Polishing removes dirt and starch residue from grains, giving them a characteristic shiny appearance. Beans undergo this process prior to being put in storage.

Table 4.5 Membership, Harvested Area, Production, Average Landholdings, Production and Yields of the Three Bean Farmer Cooperatives Surveyed in the Study Area. Guatemala 2,000.

Cooperatives	Members	Harvested area (ha) 1999	Average farm size (ha)	Production (MT) 1999	Average yield (Kg/ha) 1999
Ipaljá	152	526	3	664	885
AGRIJAL	825	771	1	926	842
Atescatel	60	280	5	307	766
Totals	**1,037**	**1,577**	**3**	**1,897**	**831**

Source: Field Interviews with three bean farmer cooperatives and their record keeping data. June, 2000

According to key informants at MAGA, cooperatives lack a defined marketing strategy, which constrains their economic takeoff. Despite having modern infrastructure and equipment, bean farmer cooperatives have relied on sales to wholesalers, incorporating very little value added to dry beans.

In most cases, cooperatives assemble beans from their members, clean, polish and store them, but are able to store them only for a short time (1-2 months) due to liquidity constraints. Thus, in most cases, cooperatives are unable to store beans sufficiently long to take advantage of the post-harvest price rise and thereby optimize farmers' profits.

In addition, as part of the *Governmental Strategy for Agricultural Competitiveness*, the GOG has encouraged transactions among cooperatives and bean processing firms by providing funding and leased storage facilities to cooperatives *Agrijal and Ipaljá*. Nevertheless, processing firms have been hesitant to purchase beans from these cooperatives, presumably due to the availability of lower-price imported beans.

Farmer Associations

After the decline in the popularity of cooperatives in the late 1980s, MAGA, as well as international development NGOs, encouraged farmers to organize themselves into associations to facilitate agricultural marketing.

Of the ten organizations surveyed, seven represented some form of farmer association. *Adecicetrepsa, Asociación de Productores de Quezada, Asociación de Productores de San Juan Emita* and *Adisque* are grassroots farmer organizations whose formation was supported by the GOG. *Sindicato Agrícola* is a farmer' union, initially organized to protect the interests of farm workers, and *Pastoral Social de Comapa* and Fuentes *de Vida Adissa* are farmers' organizations formed with the support of religious organizations.

As shown in Table 4.6, in 1999 these seven farmer associations accounted for 10,200 MT, equivalent to 6.9% of regional production. The primary activity of farmer organizations is to search for reliable markets for their members' food commodities. However, since most farmer organizations do not have employees (only a board of directors who have no salary), the people in charge of identifying marketing outlets are farmers that volunteer their time.

Table 4.6 Membership, Harvested Area, Production, Average Landholdings, Production and Yields of the Seven Bean Farmers' Associations Surveyed in the Study Area. Guatemala, 2,000.

Farmers' Associations	Members	Harvested area (ha) 1999	Average farm size (ha)	Production MT 1999	Avg. Yield Kg/ha
Adecicetrepsa	5,000	2,454	0.49	2,543	726
Sindicato Agrícola	67	34	0.50	38	781
Asociación de Prod. Quezada	88	75	0.85	75	697
San Juan Ermita	82	360	4.39	546	1,064
Pastoral Social de Comapa	97	90	0.93	116	908
Fuentes de Vida Adissa	1,268	1,775	1.40	1,864	1,050
Adisque	176	2,636	14.98	3,074	817
Totals	**6,778**	**7,422**	**3.36**	**10,254**	**863**

Source: Field Interviews with seven farmers' associations, and their record keeping data. June, 2000

Thus, these farmers' associations have primarily focused on contracting bulk transportations services, in order to increase their bargaining power and lower transactions costs.

4.4.2 Bean Distribution

Participants in the bean marketing channels were identified by reviewing the literature, direct observation and discussions with individual farmers, traders, cooperatives and leaders of farmer associations.

Wholesalers in Guatemala City

Bean wholesalers are the agents who transfer sacked beans from traders, farmer associations, cooperatives and small groups of farmers to market vendors, grocery stores, corner stores and, in some cases, to supermarkets. Most wholesalers act as intermediaries (purchase, store, and then sell).

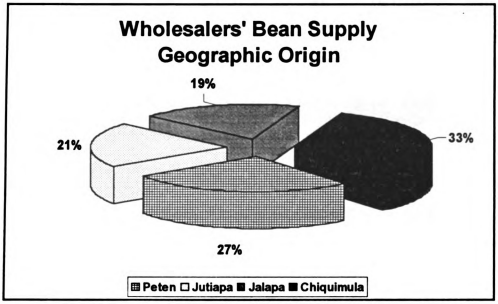
Wholesalers are clustered in two areas of Guatemala City, the Terminal Market and from the 21st to the 23rd streets of Zone 1. There exists no official data as to the number of bean wholesalers in Guatemala City. Based on information provided by traders, farmer associations, and cooperatives, the population of large wholesalers (business greater than 100 MT/year) was estimated to be sixteen, out of which six were surveyed.

These wholesalers procured their beans mainly from the departments of Petén (27%), Jutiapa (21%), Jalapa (19%), and Chiquimula (33%) as shown in Figure 4.4. These proportions are consistent with the geographic distribution of bean production and support the thesis that the majority of surplus bean producers farm in departments within the study area.

The six firms that were surveyed purchased 2,300 MT (1999). Assuming that they are representative of the total population of wholesalers, we can infer that approximately 13,000 MT of beans (10% of the national production) pass through the larger wholesalers in Guatemala City[10].

[10] Estimated by multiplying the average annual purchase of the 6 firms by 16.

Figure 4.4 Geographic Origin of Wholesaler's Bean Supply by Department. Guatemala City, 1999.

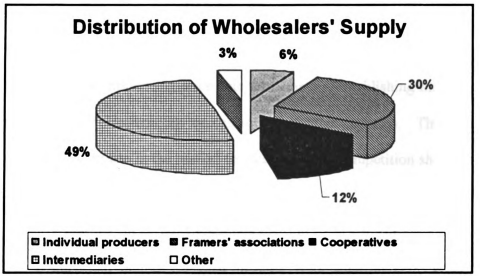


Source: Field Survey of six wholesalers in Guatemala City. July, 2000

As shown by Figure 4.5, the wholesalers obtained most of their supply from intermediaries (49%), but also from farmers' associations (30%), cooperatives (12%), individual producers (6%), as well as from their own production (3%).

Based on direct observation and survey data, farmers, traders and consumers believe that wholesalers have an important influence on price determination and exercise considerable market power. Several factors suggest the existence of imperfect competition in bean marketing. First, barriers to entry are high. Key informants reported that to become a wholesaler, a person needs to have access to $ U.S. 100,000 in capital in order to purchase storage facilities and a building near the 'bean cluster' of

Figure 4.5 Main Sources of Wholesalers' Bean Supply. Guatemala City, 1999.



Source: Field Survey of six wholesalers in Guatemala City. July, 2000

of wholesalers and to provide their suppliers with cash advances in order to purchase beans from producers.

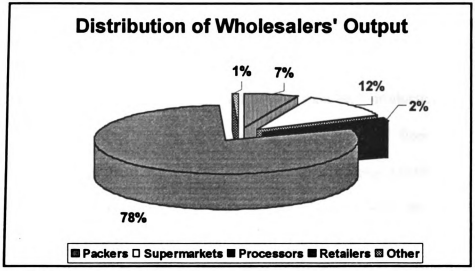
Second, social capital plays an important role in transactions between traders and wholesalers. In most cases, wholesalers provide traders with cash advances to purchase beans from farmers. However, in the absence of mechanisms to enforce contracts, social capital becomes the only way to ensure compliance. Social capital is build over a long period of time, as indicated by the length of time that the largest wholesalers have been in the market (*i.e.* 4 to 24 years).

Third, access to timely price information is very limited. Government officials collect price data mainly from wholesalers, which reduces their reliability and provides wholesalers an opportunity to follow a price-setting strategy (speculation). Key informants reported that wholesalers accumulate large stocks of not only beans, but also maize and

rice, in order to increase the price, which has given them a negative image in the eyes of the general public. Nevertheless, based on their critical role within the subsector (*i.e.* transmitting demand and supply information through prices, influencing price determination and establishing minimum standards), wholesalers can be considered channel captains. Thus, any attempt to intervene in the market to induce greater competition should be targeted to these actors.

While the surveyed wholesalers distributed beans to retailers at all levels, the main outlets for their product were supermarkets, grocery stores, and market vendors, which purchased beans in 100lb sacks, to be resold by the pound (Figure 4.6).

Figure 4.6 Distribution of Wholesalers' Output. Guatemala City, 1999.



Source: Field Survey of six wholesalers in Guatemala City. July, 2000

The main constraints reported by wholesalers during interviews were a lack of funds to expand their activities, lack of quality standards for beans, lack of coordination with bean canning firms, and absence of a secure environment (against burglaries and violent crimes) for carrying out their daily business activities.

4.4.3 Bean Processing

4.4.3.1 Bean Packing Firms

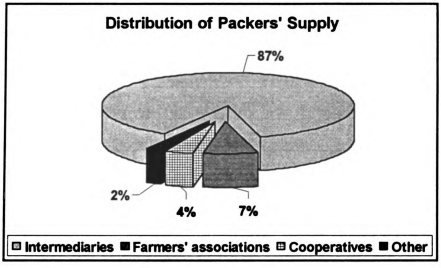
Commonly known as baggers, packing firms purchase beans and rice from cooperatives, farmer organizations, and traders, and package them in plastic bags for distribution among retailers. While the process is labor intensive, it does not require technical skills or machinery.

Almost all of the country's packing firms are located in Guatemala City. Although over 30 packing firms operate in the capital, most of these firms are informal household industries. Of the five registered firms, four were surveyed during the field research. In 1999, these four firms handled 14,300 MT, which represented over 13% of total bean production for that year. According to key informants in the Ministry of Economy, the remaining informal firms could account for an additional 4,000MT. Thus, about 17% of Guatemala's total production of beans passes through these packaging firms.

In terms of procurement, 87% of these packers' input were purchased from assemblers and traders, 7% from farmer associations, 4% from cooperatives, and 2% from other suppliers (*i.e.* small groups of

farmers and small traders), as shown in Figure 4.7. According to key informants among bean packers, they purchased from wholesalers only on rare occasions, since wholesalers sell their output at substantial markups, which would limit the competitiveness of their product.

Figure 4.7 Distribution of Packers' Bean Input, by Supplier. Guatemala City, 1999.

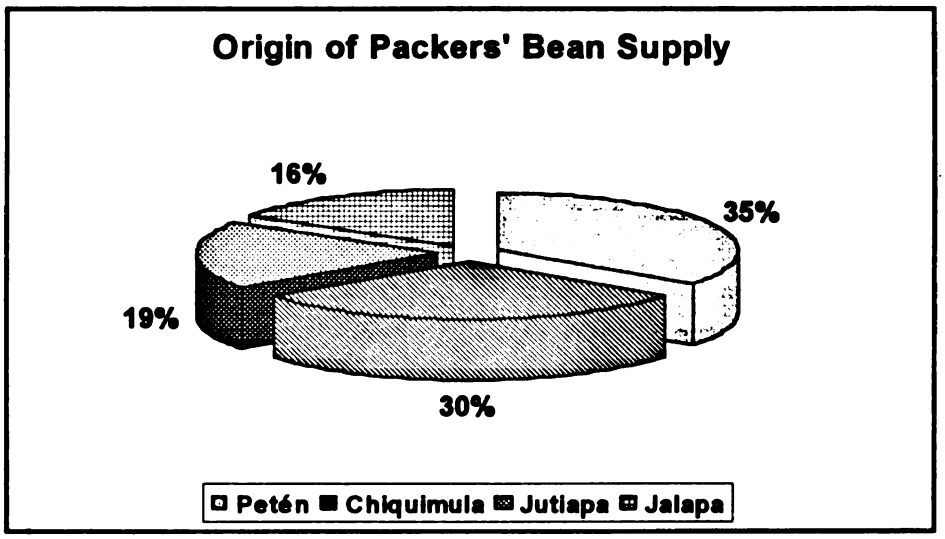


Source: Field Survey of four registered packers in Guatemala City. July, 2000

As was the case for wholesalers, these packing firms procured their bean supply primarily from the departments of Jalapa (35%), Chiquimula (30%), Jutiapa (19%), and Petén (16%), which is consistent with national statistics and *a priori* information on the geographical distribution of commercial bean production (Figure 4.8).

Packing firms purchase most of their bean supply from July to early February. Thus, they must have capacity to store at least a four-

Figure 4.8 Geographical Distribution of Packers' Bean Supply by Department. Guatemala City, 1999.



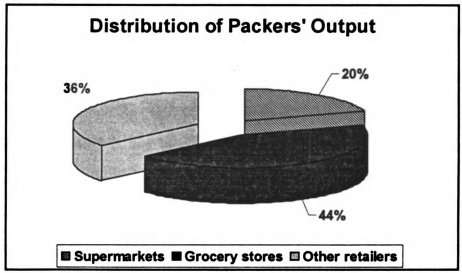
Source: Field Survey of four registered packers in Guatemala City. July, 2000

month-supply, in order to satisfy their demand, which is uniform across the year. Packing firms' storage facilities consist of silos and warehouses for sacked beans, which among the surveyed firms, ranged from 140 to 2,200 MT, with an average of 1,150 MT.

The four packing firms that were survey reported that the outlets for their production were mainly supermarkets (44%), but also grocery stores (36%), and other retailers (20%). Sales to other retailers included wholesalers, who purchase large volumes and distributed to small 'corner stores".

The target market for packers consisted of medium and upper level consumers, who purchase food in supermarkets and grocery stores. In contrast, most low-income households purchase unpacked beans, which they buy by the pound in markets and corner stores from a sack (Figure 4.9).

Figure 4.9 Distribution of Packers' Output, Based on Distribution Channel. Guatemala, 1999.



Source: Field Survey of four registered packers in Guatemala City. July, 2000

A common complaint against packing firms is that, although the metric system is not used to weight food products in Guatemala, bean packers label their products in metric units and disregard round numbers (*i.e.* consumers are used to purchase by the pound and packages are labeled 400g, 600g, 900g, 2,000g). Thus, in most cases consumers buy a 400g bag, assuming that it weights one pound (450g). However, in reality, the price is actually higher that the price of one pound of beans.

Furthermore, *informal* packing firms label their products as "350g exact weight", but actually sell them as one pound. In these cases, profit margins account for a significant share of sale price. While these firms' packing practices are interpreted by some consumers as opportunism--given the fact that most people in lower income layers are not able to discriminate between the metric and English systems--they argue that they

are actually complying with government regulations by stating the exact weight.

Packers' marketing margins were calculated, based on the difference between prices paid to traders and the wholesale price paid by supermarkets. In July 2000, this difference was 18.2%. According to key informants (traders and supermarkets), price margins can reach 26% during the off-season period. However, according to packers, the higher margins during the off-season period is due to the cost of storage, in addition to financial costs, since packers usually sell to supermarkets on 2-week credit.

Finally, packing firms complained about the inability of the government to provide financial assistance for their expansion and to guarantee security for them and their assets, as robberies of distribution trucks are very frequent (1-2 times per truck per year).

4.4.3.2 The Bean Canning Industry

There are four bean-canning firms in Guatemala. Three of these firms produce other lines of canned products, including fruit cocktail tomato paste, hot peppers and fruit juices, while the other one produces only of canned beans and fruit juices.

The oldest canning firm, Kern/Ducal, which was established in 1958, originally produced fruit juices for the local market. However, in the late 1970s, Kern/Ducal began to produce canned beans, as they noticed

a growing demand for imported refried beans. Currently, this firm produces canned fruits and vegetables, tomato paste, vegetable juice, ketchup, a large selection of fruit drinks, and refried beans. Kern/Ducal is a subsidiary of *Riviana Foods*, based in Houston, Texas. However, according to its investor reports[11], Riviana has been experiencing losses in their Central American operations, including Kern/Ducal, due to difficult economic conditions and high costs associated with product distribution. In 2,000 *Kern/Ducal* reported a 7% increase in unit volumes and *Pozuelo* (their Costa Rican subsidiary), reported a 2% increase in unit volume, but their operating profit declined by 6% and sales revenues also declined by 1% in (Riviana Foods, 2000).

Malher, an independent firm that was founded in the 1970s, produces powdered chicken broth, chicken, beef, and seafood bouillon. However, powdered chicken broth is its most popular product, for which their market share is about 50%.

Lozano, another independent firm, was established in the late 1960s. Its main product lines are apple and grape juices, but it added refried beans to their product line in the late 1970s. However, canned beans account for only a small share of their total sales.

Alimentos Maravilla, S.A, is a division of Cervecería Centroamericana, S.A, a major Guatemalan corporation that produces beer, purified water, soft drinks, snacks, fruit juices, and several dozens of

[11] Riviana's Investor Reports http://www.riviana.com/annual.htm

other products. *Alimentos Maravilla* started producing canned beans in 1998, which are marketed through a joint venture with Del Monte Foods.

According to key informants in the food industry, the conversion ratio from dry beans to canned (refried beans) is 3.5, which means that every pound of dry beans will yield on average, (depending on the technology used), 3.5 pounds of refried beans.

For the domestic market, processing firms sell refried beans in cans with 5.5, 10.5, 16, and 29 ounces. In contrast, canned beans for export usually contain 16 or 29 oz of refried beans.

According to customs information, all four firms export canned beans to Central America. However, only *Kern/Ducal* and *Alimentos Maravilla/Del Monte* export to the U.S. and Europe. When asked about their target consumers in the U.S., one of the canning firm's marketing executives said: "There is one and a half million Guatemalans living in the U.S. and most of them are willing to pay a premium for canned beans coming from their home country, it is just part of nationalism". Further research showed that Del Monte's and Kern/Ducal's labels are sold in cities with a large population of Guatemalans, such as Los Angeles, Chicago, Washington, D.C., Newark, Houston, Dallas, and Miami. A rapid survey of prices in Chicago and Washington showed that refried beans imported from Guatemala are sold at prices 15 to 26% above similar products produced in the U.S.

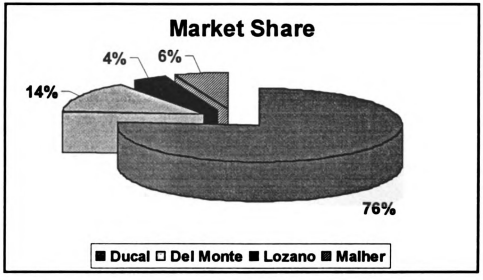
In addition to exporting to the U.S., Del Monte and Kern/Ducal also export to Mexico, South America, and Europe. In order to develop a market, they have implemented advertising campaigns via the press, radio and television, which are targeted at clusters of Guatemalans and Central Americans.

Currently, 30% of the beans canned by the Guatemalan industry are exported, while the remaining 70% are for domestic consumption (PRONACOM, 1999). Until the early 1990s, families mainly consumed canned beans during vacation trips or by high-income households. However, more recently as women have increasingly begun to participate in the labor force and the opportunity cost of their time has increased, medium-income families have adopted the product--even though refried beans cost four times more per ounce than dry beans.

Regarding the domestic market, a rapid survey in Guatemala City's[12] supermarkets, grocery stores, and corner stores (based on shelf space assigned to each brand and comments from store managers) was undertaken to estimate the approximate market share of each canning company's product. Results are presented in Figure 4.9

[12] Three supermarkets, three grocery store and three corner stores were selected, one each in a low, medium and high-income neighborhood.

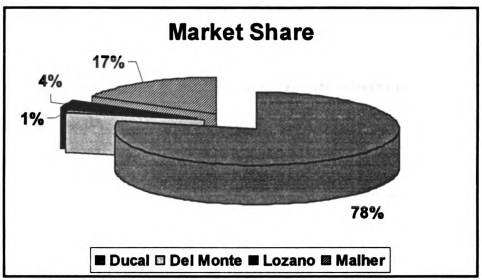
Figure 4.10 Domestic Market Share of the Four Bean Canning Firms in Guatemala City, 2,000.



Source: Survey of four bean-canning firms. Guatemala city, 2000

The shelf space-based estimate of market shares is consistent with those reported by PRONACOM in 1999 (Figure 4.10). However, our data show a redistribution of market shares due to the growth on the newest firm's brand, (Del Monte), which began operations in 1998. These figures suggest that Del Monte's growth in market share (+13%) reduced the market shares of Kern/Ducal (-2%), and Malher (-11%).

Figure 4.11 Domestic Market share of the Four Bean Canning Firms in Guatemala City, 1999



Source: PRONACOM, 1999

In response, Kern/Ducal has recently introduced new products, including canned black beans with cheese and with chorizo (spicy sausage), as well as red beans in the same preparations. Although red beans have been traditionally consumed in a lesser volume, this product is becoming quite popular.

Total production of canned beans (1999) is estimated at 7,400 MT[13], equal to 1.38% of the domestic dry bean supply (total domestic supply of canned beans divided by the average industrial conversion rate of 3.5 lb of refried beans per pound of dry beans).

[13] Calculated based on estimates provided by PRONACOM (1999), and managers of the canning firms.

Although the canning firms did not provide precise information regarding their procurement for dry beans, analysis of data from Guatemalan Customs, key informants at the processing plants, bean wholesalers, U.S. Customs and the Michigan Bean Association suggests that at least two of the firms (Kern/Ducal and Del Monte) import nearly 92% of the dry beans used for canning, mainly from the U.S., Canada, Chile and Argentina[14].

According to the same sources, these firms import mostly "splits" (i.e. broken grains) to produce canned refried beans. These firms prefer to purchase splits because they can be purchased at a discounted price of over 50%. At the time of the study (Oct. 2,000), the Ex-elevator price (Michigan) for whole beans was $. U.S. 0.15/lb, while splits were being sold for $ U.S. 0.08/lb--representing a significant saving. By contrast, during the same period, Guatemalan beans were being sold for $ U.S. 0.23/lb.

Hence, the reluctance of canning firms to participate in the GOG's initiative to encourage transactions among these firms and organized producers is clearly due to the availability of cheaper sources of beans in the international market. Key informants reported that the only time that the canning industry procures domestic beans is during the first and second months after harvest, when stocks are high and market prices are low--making domestically grown beans competitive with imported beans.

[14] In these countries, beans are mechanically harvested. During the grading process, splits are separated from whole beans and sold at a discounted price.

Consequently, there is a continued antagonism between the canning industry and domestic suppliers (*i.e.* producers, traders and wholesalers).

Furthermore, bean-processing firms follow a double standard with respect to quality. While they are exceptionally strict on quality standards for domestically grown beans (*e.g.* allowing a maximum of 2% of broken grains, etc). Domestic suppliers interpret this as a barrier to trade.

Summary

Among the distinct phases of bean production and processing, agricultural research and extension, financing and marketing are the main constraints limiting the sustainable growth of the bean subsector. Links between research and extension have been weak overtime. However, the restructure of the national extension service introduces new opportunities, especially related to the establishment of strategic alliances between the GOG and private firms to promote the adoption of improved varieties.

Financing is another aspect that constrains the growth of the subsector. Farmers' access to credit is limited due to the uncertainty regarding property rights over land, which automatically disqualifies farmers from accessing to credit, as well as to the reluctance of financial institutions to provide loans for agricultural production, due to the high degree of uncertainty. The gap left by financial institutions has been filled by local traders who provide farmers with advances in cash and in-kind, thereby reducing the bargaining power of bean producers and allowing for opportunistic behavior on the side of these commercial agents.

Bean wholesalers in the Guatemala City play an important role in the marketing chain, as in the majority of cases, they provide time utility to the product, through storage. Nevertheless, they often exercise speculative behavior in detriment to consumers, playing a determinant role in price determination.

Bean packing firms also play an important role within the bean subsector, since an estimated 17% of the national bean supply passes trough packing firms located in Guatemala City. While these firms add very little value to dry beans, their profits average 20%. In addition, consumers often complaint about the opportunistic behavior of packing firms. Their use the metric system, which is not commonly used in Guatemala to measure food products, is perceived as opportunistic behavior.

There are four bean canning firms in Guatemala, whose output is mainly refried canned beans for the domestic and international markets Two of the firms have direct linkages to international corporations, import their supply of beans and coincidently are the ones with the most up-to-date processing technology. The other two firms, which are locally owned, procure most of their bean supply from domestic sources and use older technologies in their production process. Nevertheless, refried beans account for only for a small portion of their total output (15 and 18%). In addition, economies of scale in product distribution offset their productive deficiencies, allowing them to stay in the market, although with shrinking market shares.

One of the objectives of this study was to determine the reasons that constrain vertical coordination among bean producers and the canning industry, in search of remedial measures that could encourage direct marketing, thereby adding a component of certainty to bean production. However, this study found that canning firms are

purchasing 'splits' (broken beans) in the international markets. Because splits, which are a byproduct of mechanized harvesting, are graded as low quality for canning, they are sold at discounted prices of over 45%. This finding discards *de facto* the possibilities for inducing vertical coordination, especially considering the significance of the economic incentives involved.

CHAPTER FIVE

SUMMARY AND CONCLUSIONS

5 Summary

5.1 Beans in Guatemala

Beans, are the second most important food crop in Guatemala. In 1,999 the bean producing area was estimated at 135,200 hectares, following maize (1.1 million hectares). Beans are grown predominantly by small farmers since 43.3% of the national bean supply is grown in farms with less than 7 hectares, 18.8% in farms from 7 to 45 hectares and 27.8% in farms greater that 45 hectares. A recent study (1996) found that the level of technology is inversely correlated with farm size. As indicated by that finding, bean yields on farms above 45 hectares were 48% above farms below 7 hectares.

Beans are consumed throughout Guatemala, with no substantial regional variation with respect to their relative importance in the diet. A large percentage of rural households (79%) grow their own beans, while the supply of beans for urban households comes from surplus production in the rural areas. Empirical data show that the market shares of canned beans, as well as influence of packaged beans are increasing. Estimated market shares (2000) of bagged beans and canned beans were 17% and 1.38%[1] respectively, the latter with an annual growth rate of 12%.

Since the late 1980s, total bean production has followed a decreasing trend due to a decline in cultivated area and yields. Since 1986, domestic production has decreased by 4.9% annually (MAGA, 1998), while population has been growing at a rate of 2.7% per year (FAO, 1999). While this implies a 30% reduction in domestic per capita

[1] The estimate of canned beans was made based on dry weight. Dividing the total domestic supply by the industry's average conversion rate of 3.5 lb of refried beans per pound of dry beans.

availability over the 1986-1998 period, a recent study (INCAP, 1999) shows that despite moderate reductions in per capita consumption of beans, it has not decreased to such an extent. This finding indicates that the deficit in national bean supply has been supplemented by non-commercial household production which is often not included in official data. In addition, Guatemala has not conducted an Agricultural Census since 1979, and official data seldom report bean production by producers with plots less than 0.5 hectares.

Farmers' bean enterprises are typically quite small. About 94% of farmers plant only 0.5 to 2.5 hectares, while 3.75% plant 2.51 to 5 hectares, and only 2.25% grow more than 5.1 hectares of beans.

National bean yields average 532 Kg/ha. Despite several decades of agricultural research that has been carried out by ICTA and before by the National Agricultural Institute (IAN), weak links between generation and technology transfer partly explain the low rates of adoption of improved technologies. In an effort to strengthen research-extension linkages, in 1996 a new agricultural extension system was introduced, based upon contracts between farmers' organizations and private consulting firms, and supporting through government funding. This approach has proven to be a more promising way to transfer technology, providing farmers greater opportunity to identify their problems and seek solutions to relax their constraints.

To gain a better understanding of the constraints to expanding commercial bean production, ten farmers' organizations were surveyed in the study area. These organizations had 7,821 members who accounted for 16.4% of total farmers in the

region. Of these farmers 84% owned from 1 to 5 hectares; 8.6% owned from 5.01 to 8 hectares; 4% owned from 8 to 15 hectares , and 3.4% owned more than 15.01 hectares.

Yields in the region ranged from 697 to 1,063 Kg/ha, with an average of 847 Kg/ha. These data confirm that in the study area agro-ecological conditions and higher adoption of improved varieties have a determining influence in yields. In the study area, characterized by high-technology production, compared to the rest of the country, the rate of adoption averaged 32%, including farmers who bought improved seeds as far a 5 years ago and are still using the same line.

Farmers in the study area sold most of their bean crop at harvest. After retaining 22.5% of their production for household consumption these farmers sold their remaining harvest to assemblers (55%), farmers' associations (11.9%), cooperatives (8.6%), and individual (direct) sales (2%). The key role that assemblers and traders play in the small farmer marketing system can be partially explained by the failure of the financial system to provide assistance to small producers.

Available data indicate that less than 2% of bean farmers receive production loans from financial institutions. Banks are reluctant to support farming activities, since according to conservative estimates, over 66% of all farms in the country are not properly titled, which prevents farmers from qualifying for credit. Thus traders have filled this gap by providing advances in cash and kind (agrochemicals). However, traders require that farmers sell their harvest to them at discounted prices. Another factor that explains the structure of the marketing channels is the dispersion of production. Traders are the only agents willing to bear the cost of assembling the commodity. However, some producers transport their beans to farmer organizations or

cooperatives for delivery to Guatemala City, or to local markets where they sell to market vendors. While farmers' organizations and cooperatives neither store nor add value to their product in any other way, marketing large quantities of beans enables them to reduce transportation costs and at the same time increase their bargaining power with traders and wholesalers.

Typically, farmers view traders as a threat to their economic well-being, since in the past, traders have used private information and exercised opportunism to increase their gains from trade. However, several market failures favor such behavior, including the lack of effective channels for the dissemination of market information and the absence of a clearly defined system of grades and standards for beans for domestic (non-industrial) use. Nevertheless, traders do play an important role in the bean marketing system by bearing the transaction costs associated with assembling dispersed production, providing financial assistance and communicating market information through prices.

All of Guatemala's sixteen major bean wholesalers are located in Guatemala City. The Ten of them that were interviewed purchased 1.8% of the bean crop.

Wholesalers in Guatemala City, play an intermediating role by buying, storing and selling sacked beans, without adding value other than through storage during the off season periods. However, the wholesaler survey confirmed *a priori* information provided by key informants regarding their role as channel captains, given that they play an important function in determining market prices, minimum quality requirements, frequency of deliveries and form of payment (credit or cash). In addition, because barriers to entry are high, wholesalers are in an ideal position to exercise market

power. In fact, it is a common belief that wholesalers set prices below the equilibrium during the peak season.

Bean packers include five large registered firms and 25 small non-registered businesses. Bean packing firms also appear to exercise market power and some degree of opportunism. While these firms add some value through cleaning and bagging, they sell their products at significant markups. In addition, bagging firms use a system of measures with which the majority of consumers are not familiar--especially informal packing firms , which are not audited by government agencies--and exercise opportunistic behavior to a greater extent than do formal sector bagging firms (*i.e.* selling bags with 350grams of beans as a substitute for 1lb bags, while charging the same price).

The processing industry is made up of four firms that currently produce refried canned beans. Total output of canned beans was 7,400 MT in 1999. Two of these firms (Kern/Ducal and Alimentos Maravilla, S.A) have direct relationships with transnational corporations. In year 2000, *Kern/Ducal* reported decreasing revenue due to high transaction costs in their Guatemalan operations. The sources of these costs are the high costs of transportation and security services, which have become indispensable due to the social instability prevalent in the country.

Currently, only 1.38% of annual bean consumption is in the form of canned beans. However, there appears to be a growing demand for canned beans, as indicated by the emergence of a new canning firm, as a subsidiary of *Alimentos Toledo* in the second quarter of 2,000. This firm is associated with a large corporation that also produces poultry, pork, and other products, and subcontracts canning to one of the four

existing firms. Additionally, the emergence of this new division of *Toledo* suggests that there exists a favorable institutional and regulatory framework for bean processors in Guatemala.

Conventional wisdom highlights the inherent benefits to farmers, derived from the growth of the food industry, by providing a new outlet for their crop. In the case of Guatemala, the expansion of the processing industry has had negative effects on bean producers. The two main processing firms import nearly 92% of their bean supply from the U.S., Canada and South American countries. These firms import mainly 'splits', which are the broken grains sold at discounted prices equivalent to 45% of the whole bean price. Thus, since brokens are substituted for whole beans in processing refried beans, Guatemalan bean farmers have not benefited from the expansion of the processing industry. Interestingly, Del Monte and Kern/Ducal sell canned beans in the U.S., as if they were Guatemalan beans, and are being paid a premium of over 26% by Guatemalan consumers, based on the utility derived from consuming food from their home country.

Clearly, the Guatemalan bean canning industry is dualistic –consisting of two highly competitive firms with international linkages, up-to-date machinery, standardized production protocols, and imported supplies, and two locally-owned, less competitive firms, with older machinery, and domestic bean supply. These local firms are able to stay in the market due to their low dependence in beans, as their main products are fruit juices and powdered chicken broth.

5.2 Policy Recommendations to Support the Phase of Agricultural Production

This study documented the strategic importance of the bean subsector, from the standpoint of food security.

Disregarding the limited prospects of industrial transformation, and despite their inability to compete with imported beans, farmers will likely continue to grow beans due to their importance in meeting their food needs.

Provided that policy regarding bean imports remains stable, processing firms will likely continue to import most of their bean supply, with eventual purchase of domestic beans whenever the price falls below the international market for brokens. Nevertheless, at least until 2,005, when tariffs will be eliminated due to free trade agreements, imports of whole dry beans for household consumption will remain limited. While dry beans are cheaper in the international market, the existing 20% import tariff makes it prohibitively expensive to import them. However, the import tariff makes does not affect imports for the processing industry, as the low market price for splits offsets the negative effects of the tariff.

The main constraints to the subsector's growth are:

5.2.1 Low Rate of Adoption of Improved Varieties

Farmers in the study area are skilled agricultural producers, and have in-depth knowledge of agricultural practices and the use of agrochemicals. However, the low rate of adoption of improved varieties is a pervasive constraint to increased production, since most commonly planted varieties are neither resistant to plant diseases nor to adverse climatic conditions, and are low yielding. Hence, the low rate of adoption contributed to high

per-unit cost of production for non-adopters, consequently reducing their competitiveness. In domestic markets low profitability has resulted in a reduction of commercial bean production.

Needed Actions:

In order to overcome these constraints, agricultural research must be re-oriented in order to focus on increasing yields and reducing production costs, and promoting large-scale multiplication of improved seeds, while facilitating distribution to private outlets of agricultural inputs, through and agreement with MAGA offices.

ICTA must establish links with private providers of technical assistance in order to develop strategic alliances tending to promote dissemination of information about improved varieties to promote their adoption. Considering the commercial focus of such firms, the strategic alliances much involve economic incentives proportional to the rate of adoption at regional level (i.e. commissions based on regional adoption rates, similar to the reward system utilized by pharmaceutical firms).

To facilitate adoption by producers, new strategies are also needed. A good example of such an innovative strategies is the 'kilo por kilo' program in Mexico, which allows farmers to exchange a kilogram of improved seed for a kilogram of common grain, in order to facilitate adoption of improved varieties.

5.2.2 Absence of Financial Support for Bean Production

Due to the high degree of uncertainty associated to the production and marketing of staple crops, banks are hesitant to approve such loans because the probability of non-repayment is considerably low. As a result, farmers must rely on traders and assemblers, who in some cases provide advances in cash and in kind, help farmers to solve their immediate cash constraints.

Thus, the absence of financial support for bean production constitutes a major determinant for the subsector's structure and performance. While traders fill this existing gap, they exhibit opportunistic behavior to the detriment of producers, who experience a reduction of their bargaining power (*i.e.* must sell their crop to the trader at a discounted price).

Needed Actions:

In principle, increasing the certainty of property rights over land must continue to be a priority in the governmental agenda, since in the long run it is the only measure that will democratize access to credit.

Provided that the land titling process will take and additional seven years to be concluded, two contingent measures should be put in practice: a) establishment of an association-based credit system to provide loans to farmers despite the availability of land titles (*i.e.* though RADEAS and

farmer associations), and relying on social capital; b) the initiatives to introduce agricultural insurance must be encouraged and facilitated by MAGA, especially considering the potential benefits of a program of this sort in supporting the access of small landholders to agricultural credit.

5.3 Policy Recommendations to Support the Phase of Marketing and Distribution

5.3.1 Market Failure and Adverse Selection

Market failure has created uncertainty throughout the bean subsector and thereby further reduced incentives for commercial bean production. Key examples of market failure includes a weak system for the dissemination of market information, a 'non-transparent' system of grades and standards for beans for domestic (non-industrial) consumption, and barriers to entry and exit at the trading level, which encourages opportunistic behavior by traders and wholesalers.

Needed Actions:

MAGA must ensure the effectiveness in the timely dissemination of market information, preferably by using commercial AM radio stations, which are the most popular media in the rural communities of Guatemala. Reliable market information will improve the bargaining power of bean producers, reduce the possibilities for opportunistic behavior on the side of traders and wholesalers, increasing market transparency and improve competition.

A system of grades and standards for agricultural grains should be adopted and enforced, allowing for the reduction of transaction costs and evolution of market futures and options.

In order to increase competition among wholesalers, grain storage facilities in possession of the GOG must be sold or leased to farmer organizations, in order to allow for the establishment of new trading agents.

5.4 Phase of industrial Transformation

5.4.1 The Bean Processing Industry

Since the mid 1990s, the processing industry has expanded rapidly in response to increasing domestic demand, following increases in the income of young households in which both, man and woman work outside the home. Hence, due to an increase in the opportunity cost of their time, these households prefer to consume processed products. Also, the population of Guatemalans in the U.S. is growing in number and income, which has contributed to a growth in export demand for canned beans. Thus, as a result of demand, a fifth canning firm has been recently established.

Despite the poor performance of the bean subsector, stagnating local production has had little impact on the canning industry because bean producers have a guaranteed supply of imported dry beans at prices that are below the price of domestically grown beans. Despite a 20%

import tariff on beans, their final cost (CIF Guatemala City) was below $.U.S. 0.20/lb, while the price for domestic beans averaged $.U.S. 0.36/lb (July, 2,000).

A determining factor in the economic success of the two leading firms has been the fact that they are able to take advantage of economies of scale, using the same plant facilities to produce a large array of products, which results in higher efficiency. In addition, these firms are planning to further diversify their bean products, developing new recipes including beans with hot pepper, lard, pork meat, and eventually (refried) beans and rice.

Based on the current price structure of canned beans, the two firms with lesser percentage of market share are likely to survive for a few more years without major technological improvements, although the market share of the largest firms is most likely to increase.

Policy Recomendations:

At this point, no further resources should be dedicated to encourage coordination among bean producers and processors, since in the absence of economic incentives such coordination is not viable. In addition, the proportion of brokens among domestically-grown beans is not significant, considering that the majority of broken beans are a byproduct of mechanized harvesting, which is not used in Guatemala.

5.5 Limitations of the Study and Future Research

This study has uncovered important threats and opportunities for the Guatemalan bean subsector, most of which will necessarily be addressed by further research. The following are some of the most relevant questions that remain to be answered:

- To what extent do the bean canning industry contribute to national income and social welfare?
- What are the implications in terms of producer and consumer surplus, and social welfare, derived from the bean imports?
- What is the volume of non-declared bean exports to El Salvador?
    - What are its implications in terms of price change?
- What are the reasons behind the limited multiplication of bean seed?
- How can the competitiveness of bean producers be improved?
    - Can Guatemalan producers take advantage of "Cause Marketing" and "Ethical Purchasing" in order to promote black beans with special attributes in developed countries?

APPENDIX A

Main Characteristics of Improved Seeds Developed and Distributed by ICTA During 1997-1999.

ICTA OSTUA. DOR42/ICTAN 78-12 ***(Lowlands)***

Developed by ICTA between 1981 and 1985. Highly resistant to bean golden mosaic virus (BGMV), rust, common mosaic and drought tolerant. Blooming starts 72 days after planting, producing beige pods afterwards. Plant height ranges between 35 and 45 cm. Growth habit II, indeterminate bush. Yield: 2,590 Kg/ha.

SANTA GERTRUDIS. DOR364/G18521/DOR365/LM30630 ***(Lowlands)***

Variety of opaque black beans developed by ICTA and CIAT between 1988 and 1992. Recommended for its resistance to bean golden mosaic virus (BGMV), rust and common mosaic. It is the variety with the highest yield potential that has been developed by ICTA. Blooming starts 37 days after planting. Plant height ranges between 50 and 60 cm. Santa Gertrudis reaches physiologic maturity 75 days after planting. Yield: 3,180 Kg/ha.

ICTA LIGERO. DOR385/JU 90-4 ***(Lowlands)***

Developed between 1993 and 1998. It is highly recommended for its precocity, blooming takes place 30 days after planting, reaching physiological maturity at 65 days. It is the variety with the highest level

of resistance to bean golden mosaic virus in the world, in addition it is resistant to rust and common mosaic. Plant height ranges between 25 and 35 cm. Yield: 1,800 Kg/ha And additional characteristic for the Guatemalan market is the fact that ICTA Ligero provides a high percentage of solids, resulting in thicker soup.

ICTA ALTENSE. A230/GUATE192/A175 ***(Highlands)***

Opaque black bean developed specifically for the central highlands of Guatemala. It is resistant to diseases such as anthracnose, rust, *Ascochita* and pests such as pod weevil. Ideal for altitudes between 1,800 and 2,300 masl[1]. This variety reaches physiological maturity 125 to 130 days after planting . Its growth habit is type II, undetermined bush, and plant height ranges between 35 and 45 cm. Yield: 1,800 Kg/ha.

ICTA TEXEL. Line 86-30. ***(Highlands)***

An improved variety developed between 1987 and 1991. Notable for its resistance to angular spot and its precocity. In addition, it is resistant to rust, common mosaic and *Ascochita.* Its growth habit is type II, undetermined and erect. It reaches physiological between 105 and 110 days after planting, plant height is between 35 and 40cm. Yield: 1,300 Kg/ha.

[1] meters above sea level.

ICTA HUNAPU. A216 = C132-4CM-4CM. ***(Highlands)***
Alias: Negro Pacóc

Developed between 1980 and 1990. This black bean variety is notable for its precocity, and reaches physiological maturity 125 days after planting. Hunapú is one of the varieties with the world's highest resistance to *Ascochita* and anthracnose. In addition, it is resistant to rust and common mosaic. Its growth habit is type II, undetermined and erect. Plant height ranges between 25 and 35 cm. ICTA Hunapú provides a high percentage of solids, resulting in thicker soup. Yield: 1,800 Kg/ha.

APPENDIX B

STATISTICAL SUMMARY OF THE GUATEMALAN BEAN SUBSECTOR

Table B-1

Area, Production and National Yields. Guatemala, 1985-1998

Year	Production		Yields	
	Ha.	TM	qq	Kg/Ha.
1985	170,240	117,560	2,586,320	691
1986	173,390	110,610	2,433,420	638
1987	172,060	86,140	1,895,080	501
1988	140,420	93,690	2,061,180	667
1989	97,090	90,610	1,993,420	933
1990	129,990	119,600	2,631,200	920
1991	144,130	113,640	2,500,080	788
1992	140,000	115,940	2,550,680	828
1993	120,890	100,890	2,219,580	835
1994	134,755	90,106	1,982,332	669
1995	121,259	79,553	1,750,166	656
1996	122,654	81,938	1,802,636	668
1997	124,476	83,576	1,838,672	671
1998	122,780	81,592	1,795,024	665
1985-1998	-2.77		-0.29	

Source: Economic Statistics Banco de Guatemala

Table B-2
Participation of the bean sub sector in the Gross Domestic Product
(Millions of Quetzales)[1]

Year	GDP National	GDP Ag. Sector[a]	GDP Agriculture[b]	GDP Beans	Participation %	
					Total GDP	Agricultural GDP
1985	2,936	836.20	512.20	22.99	0.78	4.49
1986	2,940	829.28	515.00	21.63	0.74	4.20
1987	3,044	861.63	540.89	16.85	0.55	3.11
1988	3,163	900.40	560.83	18.32	0.58	3.27
1989	3,288	928.04	566.50	17.72	0.54	3.13
1990	3,390	966.10	596.20	23.39	0.69	3.92
1991	3,514	996.02	618.16	22.23	0.63	3.60
1992	3,684	1,026.08	639.04	22.68	0.62	3.55
1993	3,828	1,048.67	642.73	19.73	0.52	3.07
1994	3,983	1,074.33	645.77	17.62	0.44	2.73
1995	4,179	1,112.00	672.10	15.56	0.37	2.32
1996	4,303	1,140.41	694.12	16.03	0.37	2.31
1997	4,487	1,168.92	716.22	16.35	0.36	2.28
			Growth Rate			
1985-1997	3.59	2.83	2.82	-2.81	-6.17	-5.49

Source: Annual reports, Banco de Guatemala 1985 to 1997.

[a]. GDP Agricultural Sector (Agricultural and livestock production)

[b]. GDP from agricultural production (Excluding livestock)

Table B-3
Guatemalan Bean Production vs. World Production
(1985-1997)

Year	World Production_1/ thousands of TM	National Production_2/ Thousands of TM	% Participation of National Production
1985	14,482	117.6	0.81
1986	14,482	110.6	0.76
1987	14,315	86.1	0.60
1988	15,533	93.7	0.60
1989	14,523	90.6	0.62
1990	16,266	119.6	0.74
1991	17,525	113.6	0.65
1992	15,958	115.9	0.73
1993	16,163	100.9	0.62
1994	17,938	90.1	0.50
1995	18,061	79.6	0.44
1996	18,959	81.9	0.43
1997	18,957	83.6	0.44
		Growth rate	
1985-1997	2.27	-2.8	-4.96

1/Source: FAO Annual Reports on World Production 1985-1997.
2/ Source: Production Statistics, Banco de Guatemala

Table B-4
Number of bean farms, per size range.
Harvest 1,995/96

REGION AND DEPARTMENT	TOTAL	Less than 7 Ha.		7 < 45 Ha.		Larger than 45 Ha.	
		# FARMS	%	# FARMS	%	# FARMS	%
Country total	**163,073**	**141,201**	**86.59**	**14,627**	**8.97**	**7,245**	**4.44**
Guatemala.	7,000	6,925	98.93	0	0.00	75	1.07
Alta Verapaz.	10,770	9,533	88.51	469	4.35	768	7.13
Baja Verapaz.	4,907	4,426	90.20	337	6.87	144	2.93
El Progreso.	2,558	2,022	79.05	290	11.34	246	9.62
Izabal.	1,578	620	39.29	451	28.58	507	32.13
Zacapa.	3,627	2,845	78.44	542	14.94	240	6.62
Chiquimula.	16,326	15,267	93.51	603	3.69	456	2.79
Santa Rosa.	3,068	2,811	91.62	99	3.23	158	5.15
Jalapa.	18,297	16,527	90.33	1,129	6.17	641	3.50
Jutiapa.	12,974	11,541	88.95	1,185	9.13	248	1.91
Sacatepéquez.	5,694	3,639	63.91	2,055	36.09	0	0.00
Chimaltenango.	7,344	7,288	99.24	0	0.00	56	0.76
Escuintla.	346	346	100.00	0	0.00	0	0.00
Sololá.	5,780	5,780	100.00	0	0.00	0	0.00
Totonicapán.	3,232	3,232	100.00	0	0.00	0	0.00
Quetzaltenango.	1,554	1,554	100.00	0	0.00	0	0.00
Suchitepéquez.	0	0	0.00	0	0.00	0	0.00
Retalhuleu.	94	94	100.00	0	0.00	0	0.00
San Marcos.	2,218	2,218	100.00	0	0.00	0	0.00
Huehuetenango.	25,494	20,228	79.34	5,043	19.78	223	0.87
Quiché.	22,007	21,521	97.79	486	2.21	0	0.00
Petén.	8,205	2,784	33.93	1,938	23.62	3,483	42.45

SOURCE: National agricultural statistics, 1,995-1,996, USPADA, MAGA.

Table B-5

BEAN YIELDS, PER DEPARTMENT AND SIZE OF FARM: 1,995/96 (Kg./Ha.)

	TOTAL	<7 Ha.	7< 45 Ha.	> 45 Ha.
	YIELD	YIELD	YIELD	YIELD
DEPARTMENT	Kg./Ha.	Kg./Ha.	Kg./Ha.	Kg./Ha.
Country total.	532	429	643	813
Guatemala.	809	452	0	1,160
Alta Verapaz.	928	827	445	1,138
Baja Verapaz.	666	587	1,356	885
El Progreso.	503	392	835	686
Izabal.	1,472	852	2,117	1,334
Zacapa.	573	515	756	915
Chiquimula.	838	786	1,011	1,064
Santa Rosa.	714	535	1,673	738
Jalapa.	507	454	580	902
Jutiapa.	589	572	622	761
Sacatepéquez.	514	233	616	0
Chimaltenango.	170	146	0	757
Escuintla.	823	823	0	0
Sololá.	66	66	0	0
Totonicapán.	120	120	0	0
Quetzaltenango.	232	232	0	0
Suchitepéquez.	0	0	0	0
Retalhuleu.	227	227	0	0
San Marcos.	497	497	0	0
Huehuetenango.	203	216	207	94
Quiché.	142	140	230	0
Petén.	774	871	981	686

SOURCE: National agricultural surveys, 1,995-1,996, USPADA, MAGA.

Table B-6
Geographic Distribution of Production and Grown Area, Per farm size: 1,995/96 (TM/ ha)

REGION AND DEPARTMENT	TOTAL		Less than 7 Has.				From 7 to 45 Ha.				Larger than 45 Ha.			
	PROD. MT	AREA HAS.	PRODUCTION		AREA		PRODUCTION		AREA		PRODUCTION		AREA	
			MT	%	HAS.	%	MT	%	HAS.	%	MT	%	HAS.	%
Country Total	71,391	134,243	38,138	53.42	88,961	66.27	13,424	18.80	20,883	15.56	19,829	27.78	24,399	18.18
Guatemala.	5,392	6,665	1,493	27.68	3,305	49.59	0	0.00	0	0.00	3,899	72.32	3,360	50.41
Alta Verapaz.	2,283	2,460	1,243	54.44	1,502	61.06	32	1.41	72	2.94	1,008	44.15	886	36.00
Baja Verapaz.	1,193	1,791	891	74.72	1,519	84.82	175	14.70	129	7.22	126	10.58	143	7.96
El Progreso.	1,432	2,849	739	51.60	1,883	66.09	172	11.99	206	7.22	522	36.42	761	26.70
Izabal.	2,303	1,565	134	5.80	157	10.03	788	34.22	372	23.79	1,381	59.98	1,035	66.18
Zacapa.	2,803	4,893	1,969	70.23	3,822	78.10	696	24.82	920	18.80	139	4.95	152	3.10
Chiquimula.	12,365	14,752	9,154	74.03	11,647	78.95	1,782	14.41	1,763	11.95	1,428	11.55	1,342	9.10
Santa Rosa.	2,930	4,105	681	23.25	1,274	31.02	284	9.68	170	4.13	1,965	67.07	2,662	64.85
Jalapa.	11,836	23,359	8,597	72.63	18,926	81.03	1,366	11.54	2,355	10.08	1,874	15.83	2,077	8.89
Jutiapa.	6,732	11,434	5,154	76.56	9,007	78.77	1,208	17.95	1,941	16.98	369	5.49	486	4.25
Sacatepéquez.	3,227	6,284	392	12.15	1,682	26.76	2,835	87.85	4,602	73.24	0	0.00	0	0.00
Chimaltenango.	450	2,643	372	82.66	2,540	96.10	0	0.00	0	0.00	78	17.34	103	3.90
Escuintla.	94	115	94	100.00	115	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Sololá.	90	1,362	90	100.00	1,362	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Totonicapán.	148	1,238	148	100.00	1,238	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Quetzaltenango.	247	1,064	247	100.00	1,064	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Suchitepéquez.	0	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Retalhuleu.	2	9	2	100.00	9	100.00	0	0.00	0	0.00	0	0.00	0	0.00
San Marcos.	286	574	286	100.00	574	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Huehuetenango.	3,067	15,131	1,911	62.31	8,830	58.35	1,032	33.64	4,984	32.94	124	4.05	1,317	8.71
Quiché.	2,292	16,170	2,216	96.66	15,837	97.94	77	3.34	333	2.06	0	0.00	0	0.00
Petén.	12,217	15,780	2,325	19.03	2,668	16.91	2,977	24.37	3,035	19.23	6,915	56.60	10,076	63.85

SOURCE: National agricultural surveys, 1,995-1,996, USPADA, MAGA

Table B-7
RATIO BETWEEN CREDIT APPLICATIONS
AND APPROVED LOANS FOR BEAN PRODUCTION

YEAR	PROD AREA.	TOTAL PROD COST Q._1/_2/	APPROVED LOANS Q._2/	% FINANCED	TOTAL PROD COST US $	APPROVED LOANS US $	% FINANCED
1985/86	170,240	75,808,465	629,197	0.83	83,358,938	342,135	0.41
1986/87	173,390	77,211,171	724,877	0.94	84,901,353	818,667	0.96
1987/88	172,060	76,618,918	930,473	1.21	84,250,111	971,600	1.15
1988/89	140,420	62,529,516	649,304	1.04	68,757,414	757,452	1.10
1989/90	97,090	43,234,515	973,532	2.25	47,540,644	1,393,286	2.93
1990/91	129,990	57,885,000	709,758	1.23	63,650,308	886,270	1.39
1991/92	144,130	64,181,591	343,244	0.53	70,574,035	431,335	0.61
1992/93	140,000	62,342,488	1,757,561	2.82	68,551,758	2,165,006	3.16
1993/94	120,890	53,832,738	604,983	1.12	59,194,443	676,818	1.14
1994/95	93,828	41,782,104	745,212	1.78	45,943,574	1,036,751	2.26
1995/96	134,243	59,778,793	1,079,821	1.81	65,732,722	1,309,944	1.99

_1/ Total production cost = cost/Ha. minus financial costs
_2/ Deflated according to CPI (National Institute of Statistics).
SOURCE: Estimation based on grown area, deflated production cost, and data from private and governmental banks.

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