

"Organic products in Brazil: institutional environment and competition patterns"

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Abstract

Concerned with food safety, consumers all over the world are willing to pay premium prices for “natural food” that is supposed to be free from chemical products and other sources of contamination. “Organic food” is a particular production standard that cannot be observed and verified by customers and consumers at low cost. Moreover, safety is an issue for the organic products sector just as much as it is for conventional products. This paper addresses the issue of managing and signaling this particular food standard, in the Brazilian weak regulatory environment, where government has lost reputation as a reliable authority regarding food safety. Departing from the assumption that the consumer of organic products is looking for safety, this research intends to identify the governance structures adopted by retailers, industries, and farmers to guarantee the authenticity and reliability of their products. Finding ways to preserve reputation and premium prices in a weakly regulated environment is a real challenge, especially for fresh products. This study investigates if organic products suppliers are aware of this threat and how they are managing the supply and distribution chain to guarantee their competitive advantage.

Key Words: Organic products, Food safety, and Supply Chain management

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1. Introduction

Brazilian agri-food firms and farms have entered a period of intense competition since market liberalization in the 1990s, provoking lower prices, larger number of products, increasing market segmentation, and differentiation. Market segmentation has rested upon the quality dimension, exploring consumer trends associated to health, nutritional concerns, convenience, and food safety. Organic food, Non-GMO, Functional Products, and others support these strategies. “Organic food” can be analyzed as a particular food standard based on a specific production process.

Founded on production practices that dispense with agrochemicals and easily soluble fertilizers, organic agriculture aims to produce contamination-free food. But these characteristics cannot be directly observed by the consumer at low cost, creating the possibility of opportunistic behavior. Departing from the hypothesis that organic product consumers seek safety, the research intends to identify the governance structures that retailers, industries, and farmers adopt to guarantee product authenticity and reliability, in order to receive premium prices and preserve reputation.

In the case of organic foods, this encompasses two dimensions: first, guaranteeing the food is really organic (authenticity) and, second, that it doesn't contain chemical or microbiological contamination, being a safe food (reliability).

The production of organic products in Brazil has been regulated since May 1999, by the Ministry of Agriculture and, only, at February 05 2001 was created the National Collegiate

Organ to inspect certifiers accredited by the Ministry of Agriculture. So, the regulation of organic products is very recent.

Brazilian export products, such as soybean, are certified by internationally recognized institutions. However, in the internal market certification is less controlled. Some products have been “certified” by their own processors or producers, and governmental health authorities are ineffective in controlling different sources of contamination. Consequently, the growing organic products market may suffer from loss of reputation if contamination spreads.

Managing to preserve reputation and premium prices in this weakly regulated environment is challenging, especially for fresh products. This study investigates whether organic product suppliers are aware of the threat and how they manage supply and distribution chains to guarantee their competitive advantage. It also investigates whether consumers know of the health risks and how they evaluate different guarantee seals.

The study focuses on organic fresh products, which are more sensitive to contamination problems. Due to this fact higher coordination costs are involved, in order to keep the reputation of the products along the system.

The analysis of the governance structures adopted to guarantee the organic products standard is based on Transaction Cost Economics. Consequently, transaction attributes throughout the agri-food system are discussed, especially those related to asset specificity, complexity, and difficulty of monitoring.

Data on consumer preferences were collected through questionnaires applied to 100 consumers in an organic products market, organized by the – AOA - Association of Organic Agriculture. Data on coordination mechanisms were deeply researched with certifiers, retailers and farmer associations.

2. Organic agriculture and organic food safety.

The principles of organic agriculture were developed as of 1925 in England, and disseminated in the United States in the 40s. Their main characteristics are: a) protection of the fertility of the soil in the long run, due to the maintenance of the levels of organic matter and promotion of biological activity; b) indirect supply of nutrients for the crop, which are made available to the plants after the action of microorganisms; c) control of weeds, pests, and diseases based on crop rotation, organic fertilization, diversity, natural predators, and use of resistant varieties, with a minimum or total absence of chemical or biological intervention.

But, in the production process, the foods originating from organic agriculture are more susceptible to microbiological contamination than the conventional, because they use large scale, animal-origin organic fertilization. The humid environment associated with the utilization of manure, comprised of feces from several animals, favors the contamination of these foods, contrary to that which occurs with granulated or powdered chemical fertilization. Frequently present in animal feces are bacteria from the group of fecal coliforms, such as *Escherichia coli* and *Salmonella sp.*, which can provoke outbreaks of food poisoning when they reach high quantities in foods. It is well known that a large

number of enteric infirmities are transmitted through contaminated vegetables. (SILVA Jr. 1995).

Microbiological pathogens are not easily detected in the productive process, requiring microbiological exams. The person contaminated with fecal coliforms generally presents with diarrhea, malaise, cramps, with or without fever.

Microbiological pathogens are not easily detected in the productive process, requiring microbiological exams and their effects on the health of the consumer are, most of the time, difficult to identify after consumption, because the symptoms are related to many illnesses. The person contaminated with fecal coliforms generally presents with diarrhea, malaise, cramps, with or without fever.

Several studies indicate that normally in conventional products there is already an elevated contamination by fecal coliforms. According to Oliveira and Germano(1992), the fecal contamination of vegetables, notably those that are ingested “*in natura*”, constitute the factor of greatest relevance in the epidemiology of enteroparasitoses. And in his research, conducted in the metropolitan region of Sao Paulo, the precarious sanitary-hygienic level of vegetables offered for human consumption was detected, with elevated levels of contamination by helminths and protozoa.

The growth of the urban zone of the municipalities leads to an intersection of farming areas with recently urbanized areas, which, added to the deficiencies of the sanitation infrastructure of the peripheral areas, makes for the contamination of rivers and creeks utilized for irrigation of vegetable crops.

Various procedures are recommended to provide better quality to the water destined to irrigation, such as the utilization of stabilization tanks with at least three cells and retention time of twenty days. This procedure would reduce the contamination by virus, bacteria, helminths, and protozoa.

Food disinfection using chlorine solutions, prior to consumption, can be very effective in reducing bacterial contamination, but is not regularly employed by consumers.

Thus, potential sources of contamination in the field are: the water, incorrect manipulation of the manures, contact with other animals, and inadequate hygiene habits of the worker. To control the risk of contamination, it is necessary to identify and control the points where contamination is possible. Once these points are identified, it is possible to prevent, reduce, or eliminate risks. A microbiological test would identify signs of contamination during the production process and not only in the product when it was ready for consumption (SWANSON and ANDERSON, 2000).

3. International Panorama and the Brazilian Market

The market of organic products moves US\$20 billion worldwide, with an 8% growth rate annually. Thus it is considered one of the branches of agribusiness with highest growth of demand in the international market. Europe represents 7% of the market for these foods.

Though concepts on the production and certification processes are internationalized, each country has its norms, adapted to the different conditions of production. Most countries importing organic products, mainly European, demand certification in conformity with ISO

65 standards, whose norms are specific for the international certifiers, or the seal of the International Federation of Organic Agriculture Movements - IFOAM.

Brazil is 7th among countries supplying raw material to the European Common Market. Production has grown 10% yearly, since 1990, moving US\$150 million, of which US\$130 million was exported (Gazeta Mercantil, 2000).

In Brazil, though organic agriculture is still restricted to certain regional niches, lately it has been gaining momentum and attracting the interest of major supermarket chains, especially in neighborhoods of greater purchasing power. There are firms providing home delivery and the AOA organizes a weekly market for its members.

Brazil relies on several national certification institutions and, at the moment, several international ones are setting up shop. Some examples of national certifiers are the BDI - Biodynamic Institute of Rural Development and the AOA - Association of Organic Agriculture. As an example of international certifiers, we have ECOCERT, a French certifier beginning operations in southern Brazil.

4. Institutional Environment

To orient the issue of organic products in Brazil, the Ministry of Agriculture prepared a Decree. It establishes norms of production, typification, processing, distribution, identification, and certification of quality for organic products of vegetable and animal origin (Normative Instruction 7, Diário Oficial 94, May 19, 1999, section 1, page 11).

This decree contains objectives beyond the definition of what an organic product is in the strictest sense, following the same procedure adopted by IFOAM (Brazilian legislation

mentions explicitly that products must be free of any type of contaminant, whereas IFOAM mentions only generically the high quality of the foods).

According to the norms adopted by Brazilian certifiers, the organic products seal guarantees that the certifier do a follow-up of the production system whether vegetable or animal, by means of a specialized technician, routine visits to the production site, technical inspections, and residual analyses to verify the level of agrochemical contamination. The seal guarantees product origin, type of processing, or the processing firm.

Checking for microbiological contaminants is the responsibility of the firm that processes and commercializes the products. The Sanitation Defense Agency is responsible for inspecting processing locations, while the Municipal Supply Secretary is responsible for distribution and the Ministry of Agriculture for rural production in terms of product hygiene.

Brazilian certifiers follow international norms for organic production, where, *a priori*, all food for sale must be safe for consumption, not only organic foods. Hence, most of them do not include in their monitoring process the microbiological analysis for identification of pathogens.

According to the Normative Instruction, certifiers must be accredited by a National Collegiate Organ and State and Federal District Collegiate Organs. The lack of monitoring in this market has led to the appearance of products sold as organic, but without due certification.

5. Food safety associated to management of the Agroindustrial Chain

Baker, 1998, conducted a study on consumers, analyzing several attributes, using the statistical technique of Conjoint Analysis³. The choices reflected price, level of defects in the product, different levels of pesticides utilized (associated to the risk of cancer), and certification programs. The results indicated that consumers wish to consume safe foods and are willing to pay a price differential for this. Organic products, identified as safe products, benefit from this price premium.

Based on the hypothesis that Brazilian organic product consumers are willing to pay a premium for the safety of organic food, as suggested by Baker (1998), 100 consumers were randomly selected from among shoppers at the market organized by the AOA in Sao Paulo, where most of the consumption of organic foods is concentrated. This market is held Saturdays and exclusively sells AOA-certified products.

Most consumers interviewed believe organic food is free from any type of harmful contaminant (78%). Some commented that they only buy organic because they believe it is totally safe.

The empirical study suggests that Brazilian consumers of organic products belong to the parcel of population with greater level of education and per capita income over the country's average. Thus, this is a differentiated consumer, more demanding and more informed. Nevertheless, the consumers do not distinguish contamination by agrochemicals from microbiological contamination, assuming that organic food is safe food.

³ The same procedure will be used to analyse the consumption of organics in São Paulo.

Spers (1999) states that the search for safe products creates ever more demanding markets, and competition causes the systems to react rapidly and efficiently. The greater the need to increase product quality, the greater the incentive for the firm or agri-food system to coordinate vertically, allowing greater control over the stages the food passes through before reaching the final consumer. Consumers transmit their demand for safety attributes through their choices.

This reasoning would be correct if the consumer could monitor quality at low cost, which is not the case of processed or *in natura* foods, including organic products. The imperfect and asymmetric information on the products, besides being a source of market failure, stimulates opportunistic behavior by suppliers, especially when acting in a deficient regulatory environment, such as Brazil's. In the absence of an effective system of quality monitoring, the profit opportunity offered by the price premiums can stimulate the proliferation of quality guarantee seals and certificates undeserving of accreditation.

The guarantee of safe foods depends on practices to be adopted by each agent participating in the food agroindustrial system, making the guarantee of quality a problem of systemic coordination.

5.1 Governance Structures and Management of the productive system of organic products

The agroindustrial system of foods and fibers can be treated as the *set* of formal or informal contracts whose objective is to guarantee the process of transmission of information, stimuli, and controls throughout the productive chain, so as to respond to changes in the

competitive environment or to make entrepreneurial strategies viable (Zylbersztajn & Farina, 1999).

Insofar as Agroindustrial System is defined under a contractual prism, Transaction Cost Economics (TCE) offers us an appropriate analytical framework, following the orientation of Williamson (1985). However, insofar as we are facing a problem that involves a specific competition pattern based on quality attributes, Industrial Organization Theory is combined with TCE in order to allow its inclusion in the analytical framework of the agents' strategic decisions.

The production and commercialization of organic products presents high asset specificity. The receiving of premium prices, in the organic products system, depends on the realization of transactions among several vertically related agents. Should these transactions not occur, redirection of the organic product to the conventional product market would involve a loss of asset value, since this market does not value the procedures adopted in organic production and the costs are, in general, greater. Moreover, if there is agrochemical contamination in any stage of product commercialization or processing, it is very difficult to identify and attribute responsibility. It is even more difficult to obtain reimbursement of the loss of asset value from whoever provoked the damage.

Thus, following the TCE models, investment in production and commercialization of organic products could only be made through vertical integration or adoption of idiosyncratic relational contracts due to the elevated transaction costs involved.

The adoption of certificates issued by third parties is a transaction cost reducing tool that makes feasible the operation of the market of organic products, by guaranteeing conformity

to the pre-defined standard. However, a reliable certifier accreditation system must exist. Inasmuch as the value of the certifiers depends fundamentally on their reputation, the system tends to function based on private controls. Should the public systems of food quality guarantee be discredited, private standards can replace them, creating investment and economic process opportunities.

In the case under discussion, two elements are fundamental: definition and guarantee of the standard of organic products. As this is a standard associated to process rather than product, standard guarantee depends on characteristics of the processes in the agri-food chain, which cannot be verified by physical and observable attributes of the product (Farina & Reardon, 2000).

Standardization and classification allow payment of premiums or discounts stemming from divergences in relation to the standard, and allow long distance trade without physical inspection of the merchandise. They further facilitate coordination between the consumer and supplier, because they reduce the costs of acquiring product information.

In the case of organic products, where buyers themselves cannot verify the fulfillment of the quality standards desired, certification by an independent body becomes necessary. In its broad concept, certification is the definition of attributes of a product, process, or service and the guarantee that they fit into pre-defined norms. Certification is a step ahead of standardization from the viewpoint of Agroindustrial System coordination.

Where there is information asymmetry, there is greater space for exercising opportunistic behavior, elevating transaction costs (Williamson, 1985). Agents can reveal information

selectively, utilizing information asymmetry to their own benefit, and are thus able to act opportunistically after definition of the contract text.

Information asymmetry occurs in transactions when one party has private information, not acquirable without costs by the other party or parties.

In the commodities market buyers and sellers reasonably know the merchandise attributes, but with organic products access to information is differentiated. A product with intrinsic quality attributes must somehow transmit this information to the consumer; otherwise the consumer would be unwilling to pay a price differential. And as the consumer does not easily perceive the characteristics that differentiate the organic product, a seal from some recognized institution is essential, providing the consumer with information about the food's origin.

A certified product is, from the viewpoint of processing and industrial alteration, identical to its non-certified counterpart, that is, it can transform a commodity in a specialty, as long as the certificate is not the dominant standard. But the success of certification is conditioned to the efficiency of monitoring and the power of exclusion exercised by the institutional apparatus.

At present consumers have no way of verifying if the food contains microbiological contaminants. The lack of data on food poisoning outbreaks in Brazil, as well as on the quality of the food, mainly salads, makes it necessary to obtain information on the quality control effected by the firms.

If consumers have no way of easily distinguishing a safe product from a contaminated one, the tendency will be to not pay more for the products. It is recommendable that those involved in the agroindustrial system of organic foods take the initiative in reducing or eliminating points of risk, since this is a lucrative market, awarding those involved with price differentials.

5.2 The Brazilian Agroindustrial System (BAS) of organic tomato.

The BAS of organic tomato offers an excellent example of the importance of system coordination for the successful adoption of a standard of competition based on quality attributes. It is a product whose conventional version utilizes high quantities of agrochemicals and is consumed practically *in natura*. Hence, the tomato is highly sensitive to contamination by agrochemicals. Because it is eaten raw, there is a great likelihood of negative effects on the health of the consumer.

Figure I illustrates the BAS of Organic Tomato. Institutions such as IFOAM or the National Collegiate Organ accredit certifiers who, in turn, monitor and guarantee the attributes demanded by the standard of organic production. Only in 2001 did Brazil regulate certifier accreditation. The absence of regulation allowed several products to be sold as organic, without any type of certification.

The Sanitary Defense Agency and the Ministry of Agriculture are public organs responsible for guaranteeing food safety. Should a complaint occur about products contaminated by agrochemicals or microorganisms, the Judiciary System can penalize those responsible.

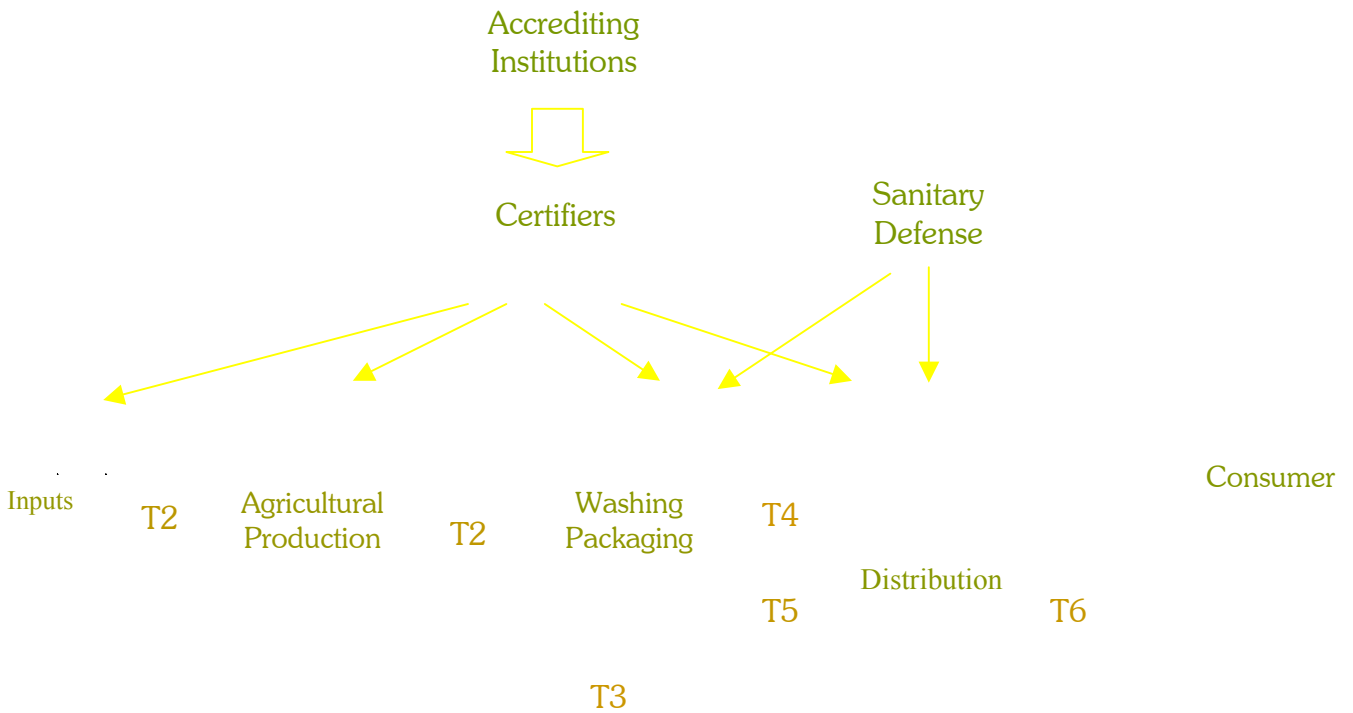
Certifiers guarantee that the inputs farmers utilize as well as the agronomic and industrial practices adopted conform to the norms for organic production. The certifiers' action is of fundamental importance in making this market viable because it is what provides the consumer with a guarantee of product authenticity while at the same time avoiding the action of opportunists, protecting the producer.

In Brazil, most organic farmers operate on a small scale. The production is generally sold and/or processed by farmer associations. The horizontal coordination of farmers also involves transaction costs, since there are horizontal externalities and incentives to free-rider behavior.

Firms with a commercial brand name such as Horta & Arte – the biggest producer of organic vegetables in Sao Paulo - also run microbiological tests on the products received from their members to guarantee the absence of agrochemicals and any other contamination. The tomato, however, is also sold in bulk, which facilitates the activity of suppliers not in conformity with the organic standard and who cannot guarantee the innocuity of the product.

Today, the organic salad tomato can cost five times more than the conventional tomato. This high price premium depends heavily on the credibility of the productive system of organic products, which in turn depends on adequate management of the system upstream. Though the price incentive has attracted a growing number of suppliers, deficiencies in the systems of monitoring and punishment can compromise the entire strategic effort.

FIGURE 1



- Certified Seeds
- Agrochemicals and soluble fertilizers are not utilized
- Manures
- Associations
- Markets
- Supermarkets
- Non-specialized food services

Figure 1 – Agroindustrial System of Organic Tomato

The main segments of the organic tomato BAS in the State of São Paulo that will be objects of analysis are:

- a) Inputs (manure and seeds)
- b) Agricultural production
- c) Processing (washing and/or sanitization and packing)
- d) Distribution

The first transaction, T1, involves the inputs supply sector. In this case, the three certifiers interviewed, the Association of Organic Agriculture – AOA, Biodynamic Institute – BDI, and Mokiti Okada, recommend that the input originate from a certified specialized firm or even from another organic rural property. Should there not be a supply of certified inputs in the region, transactions with conventional firms are permitted, as long as the origin is justified.

However, the T1 is not always realized, because in many cases the farmer produces his own inputs, as a result of other agricultural activities of the property, which is indeed the main recommendation of the certifiers.

The agricultural production of organic tomato must follow the specific technical norms of its certifier. These norms include the items of the normative instruction that establishes basic rules for organic production in Brazil, but differ in relation to required levels of production and monitoring. The differences in the norms are due to the absence of a Brazilian law, which should be prepared by the Collegiate Organ of Organic Agriculture, created this year. This organ will also be responsible for accrediting and monitoring the certifiers that act in Brazil.

Regardless of the certifier, in order for the product to be sold as organic product, the property must undergo a period of conversion, to eliminate chemical residues from

conventional agriculture. This is the major barrier to entry in this market, because during this period there is a drop in production and the product still cannot be sold with the margin of a differentiated price.

This period is rather variable and, depending on the culture to be implanted and the history of the area, can take from 6 months to 2 years. For tomato, this period is normally 6 months.

In the case of partial conversion, where only one part of the property will be converted, in addition to a specific demarcation, it is necessary to divide equipment and personnel responsible for the area, because they cannot be shared. In this case, parallel production of the same culture in the conventional model is not permitted.

After concession of the seal, when the property is considered free from residues of conventional production, the property receives scheduled and surprise technical inspections periodically, every 6 months. Should any infraction be detected, the seal is suspended and the case judged by a certification committee, existent in all certifiers. Punishment may range from suspension to exclusion.

Monitoring of production by the certifiers varies. In the case of BDI, chemical analyses are performed for concession of the use of the seal, one per year, following international norms. The AOA performs tests only in the case of a complaint or evidence during an inspection. As for the certifier Mokiti Okada, it does not perform chemical analyses; monitoring is done only based on technical visits.

The microbiological analyses are done only on the water; no certifier tests the food.

From rural production, the organic tomato can follow two paths, T2, which is to a processing firm, or T3, where the product is sold between the farmer and the consumer at specialized markets, such as the AOA organic production market in São Paulo.

Though it is a product with high asset specificity, T2 is realized through informal contracts, also known as commitments, where there is a mutual interest in negotiation and high frequency of transactions. The processing firm in most cases consists of a farmers' association, where the farmers define ahead of time what will be planted, in what quantity, and the size of the area to be planted. After the sale, the farmer receives payment for the product he delivered, but in the case of surplus supply the volume not sold is discounted proportionally from each farmer.

In one of the associations there is an exclusivity contract, where the farmer can't sell to another organic processor, but is allowed to sell at the AOA market and in the case of surplus, the farmer can sell the product as conventional.

During the interviews with farmers a conflict was reported between the processor and the farmers, because the previously agreed upon volume was not being collected.

The action of the certifiers in this process is related to the volume sold. The entry and exit bills of the products are compared. Visits occur without forewarning.

Once processed, the product can follow three paths, T4 direct sale to the consumer in home delivery services, T5, sale to the supermarket and sale at open air markets.

The Transaction between processing firm and supermarket is formalized by contracts, but according to reports – those contracts are confidential – there is no definition of the

quantities to be sold, only financial aspects in relation to the payment date and obligation to deliver a quality product. In one of the supermarkets, an agronomist was hired to verify the quality of the products in production, and it has been reported that soon chemical and microbiological tests will be performed on the food, something already normally done with conventional products.

The certifier also monitors the supermarket. In the case of BDI, analyses are done on the products sold in addition to the inspection of the volume sold, which is also done by the AOA.

6. Conclusions

The Brazilian organic products market is incipient, but shows a high growth rate. It represents a profit opportunity in food agribusiness in face of the consumer's willingness to pay price premiums. The production of organic products has been considered an investment alternative for small farmers because its technology is appropriate for smaller production scales.

Organic production is generally sold through associations or firms that gather the production of several producers, control its authenticity, and, in cases where there is brand name value, also control its hygiene. This type of organization requires managerial capabilities to coordinate participants horizontally and guarantee the standard demanded by legislation.

The organic product certificate is a tool that reduces transaction costs and improves market performance. However, this certificate does not include monitoring of food sanitation. In

Brazil, where Sanitary Defense is precarious and ineffective, one cannot dismiss the possibility of microbiological contamination of organic products. As the consumer pays a price premium for food safety and not only for the absence of agrochemicals, cases of contamination that eventually come to light can compromise the value of brand names utilized by firms selling organic vegetables and, worse, can compromise the entire development of this market.

So far, research has not identified sufficient instruments for coordinating the agroindustrial system of organic tomato that guarantee the authenticity and sanitation of the product. Contrary to what we expected because it is a specific asset with high added value, there are no formal contracts in the transactions among agents, only informal contracts, also called commitments, where there is a mutual interest and frequency in the transactions. The certifier reduces transaction costs, but has a not insignificant operational cost, which is paid by the producer who will receive a price premium for the product.

The processing and distribution sector, where brand name value is involved, according to the interviews, is organizing itself to guarantee the hygiene of the product with monitoring tools as of agricultural production.

Until recently, Brazil had no institution to accredit and inspect the certifiers. Nowadays this role belongs to the National Collegiate Organ. For a long time, the only firms inspected were those accredited internationally, such as the Biodynamic Institute, which allowed products into the market without specific certification as organic product, sold in the internal market, as is the case of the organic salad tomato. Exporting firms are certified by the BDI as it is the only certifier accredited by IFOAM.

Coordination problems that compromise food safety can be particularly disastrous in Brazil, because it is still an incipient market, with heterogeneous consumers. Recurring news leading to uncertainties about the sanitation and seriousness in the management of the chain could lead to a reduction in the development rate of this market.

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ANNEX

Results of the study on 100 consumers from the AOA market in Sao Paulo, March 2001.

Table 1

Consumer Characteristics	%
college education	75
Monthly family income over 15 minimum salaries	47
Frequently buy organic food	63
Have consumed organic foods for over 2 years	65
Prior to consumption, use some hygiene practice to reduce or eliminate microorganisms	54

Source: authors' research

Table 2 -

Agree totally that they consume organic because products are:	%
Healthy	99
Flavorful	72
Don't pollute environment	85
Contain no agrochemicals	97
Contain no contaminants	78

Source: authors' research