



## **Food safety importers' strategies and typologies of international fresh fruit and vegetables supply chains**

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## ABSTRACT

Related to growing concerns about food safety, the present heterogeneity of certifications and types of control adopted in international supply chains has been interacting with a number of private level strategies, having supermarket chains and large distributors as main protagonists, such as the strategic selection of target market or the differentiation strategy of B2B ('Business to Business') and B2C ('Business to Consumer'), which are applicable to food safety in the fresh fruit and vegetable distribution channel.

In this paper, on the one hand, we describe the types of international supply chains for fresh products, and on the other hand, the strategies related to food safety of importers and distributors in developed countries. This with the aim of determining how these strategies influence and interact with both the health risk and the management and decision processes along the supply chain. Especially, it is shown how the diversity of effects caused by the introduction and development of risk management systems is reflected in the wide range of inter-related responses performed by the different members of the distribution channel. This paper proposes a summary of the more noteworthy ones in a segmented way according to their strategic purposes.

As main conclusions of this paper we have that, due to the need and obligation for the distribution channel's members to meet the quality and safety levels required by the market, the characteristics of the linkages, which were established until now along the supply chain, have been altered towards a search for higher upstream commitments from retailers to producers, and thus, the operator's response to the new dimension acquired by food safety within the supply chain has led to the staging of new methods and procedures for its management. It can also be observed that the bulk of the literature in the area of food safety in the fresh fruit and vegetables supply chain is about the government and implementation of quality in products, processes, or with specific protocols, being much less present a pragmatic and management approach oriented to executive staff in their various areas of responsibility, as well as empirical fieldworks.

**Keywords:** food safety, international supply chain, strategies, management, fruit and vegetables.

## EXECUTIVE SUMMARY

Growing concerns about Food Safety in the European context have been raising the need for public and private coordinated policies and a homogenization of such policies in national and international distribution chains. In particular, the increase in food products transactions, such as fruit and vegetables from Mediterranean countries in recent years, is implying higher requirements on the internal organization of the chain and the development of the free market competition.

In the above framework, the project SAFEMED (no. 219262 FP7- ERANET ARIMNet), within the 7th Framework Programme of the European Union, includes the objective to determine the characteristics of the relationships among food supply chain's actors from States belonging to the northern and southern shores of the Mediterranean Sea, with reference to three countries of the European continent, France, Italy and Spain, and three north African countries, Morocco, Tunisia and Algeria.

Thus, it is considered of interest a deeper investigation of two basic aspects:

- i) To analyze the operations of the supply chain, especially for fruit and vegetables, to develop policies that ensure the health of consumers, both buyers of imported products and consumers of these products within the borders of the producing country.
- ii) To determine the potential entry barrier that food security strategies applied along the distribution channel may cause for exporters from less developed countries, taking into account the development path that primary sector exports represent to these countries.

Following the same line, as a result of the emerged debate on the unfair competition among chain members on both sides of the Mediterranean Sea, it is also of interest to identify the existence or not of sanitary dumping within the sales operations of the different stakeholders towards the European market, which could be based, where appropriate, by the disparity of the different national regulations in this area.

The effects caused within the distribution channel as a result of health alerts and non-compliance with quality standards are equally relevant in this work. Similarly, it is very important to study the internal functioning of the supply chain as well as vertical coordination relations between industry actors, in particular, those interactions resulting from strategies implemented by these operators to avoid the negative consequences of such incidents.

Thus, this deliverable, in accordance with the task 2.1. of Work Package 2 (WP2), aims to review the literature on the state of knowledge about the topics of interest discussed above. Furthermore, the purpose of this task is to provide the project with a broad view of the state of affairs, in the geographic area of reference, as a basis for the subsequent execution of activities, especially the Work Package 2 and, more broadly, for all other Work Packages and field studies (e.g. operator surveys), and, ultimately, for the analysis of data and drawing conclusions.

On the one hand, we describe the types of international supply chains for fresh products, and on the other hand, the strategies related to food safety of importers and distributors in developed countries. This with the aim of determining how these strategies influence and interact with both the health risk and the management and decision processes along the supply chain. Especially, it is shown how the diversity of effects caused by the introduction and development of risk management systems is reflected in the wide range of inter-related responses performed by the different members of the distribution channel. This paper proposes a summary of the more noteworthy ones in a segmented way according to their strategic purposes. Specifically, those implemented:

- a) For the management of health risks;
- b) Faced with the effects of the regulatory framework;
- c) As management of communication and labeling strategies towards the consumers;
- d) To develop and evaluate food safety controls;
- e) By retailers;
- f) With effects in exporting developing countries;
- g) Because of the incentives to adopt quality standards.

As main conclusions of this paper we have:

- Due to the need and obligation for the distribution channel's members to meet the quality and safety levels required by the market, the characteristics of the linkages, which were established until now along the supply chain, have been altered towards a search for higher upstream commitments from retailers to producers. These commitments are being instrumented by the adoption of protocols and quality standards beyond the Legislation (mainly developed and required by these same retailers), which has become *de facto* a technical and commercial entry barrier for third countries.
- The operator's response to the new dimension acquired by Food Safety within the supply chain has led to the staging of new methods and procedures for its management.
- The bulk of the literature in the area of Food Safety in the fresh fruit and vegetables supply chain is about the government and implementation of quality in products, processes, or with specific protocols, being much less present a pragmatic and management approach oriented to executive staff in their various areas of responsibility, as well as empirical fieldworks.

In general, it is observed that existing studies on the subject show that the adoption of Food Safety protocols are in many cases linked to strategic management decisions, such as consumer appeal, export to developed countries' markets or adaptation to the regulatory framework. However, there is a gap in the research on the connection between these strategies and financial aspects of the companies, operations of vertical integration or customer service. Similarly, there are few applied studies and scarce verification of the different theories on Food Safety, including dumping in international trade, in the different sectoral and geographical areas.

## 1. INTRODUCTION

This report corresponds to the technical memory to be presented within the realizable 2.1 activity of the SAFEMED (no. 219262 FP7-ERANET ARIMNET). This project, under the Framework Program of the European Union, aims to analyze the conditions for an international food safety co-regulation between the North and South shores of the Mediterranean Sea. As key elements considered are the study of the structure of competition between supply chains of both parts and the exam of the possibilities of a public and private coordination of food safety strategies. For this purpose, the project develops a multidisciplinary analysis that makes possible reconcile the following aspects: 1) the imperative of food safety to ensure the European consumers health by safe imports, and, at the same time, the health of southern Mediterranean consumers that must be benefited from the development of good agricultural practices internationally; 2) the access to the market for producers in the South countries, given that agricultural exports are an important factor for their economic development, 3) fair and safe competition among players in the North and South to avoid dumping phenomena by quality derived of the heterogeneity of the international food safety regulations.

Food safety is considered a public good in the sense that an underestimation of this policy can cause important damages for all parties (companies and consumers) and not only to those directly responsible for the incident. The project is designed to emphasize the particular characteristics of the economies in both sides of the Mediterranean, having into consideration three European countries (Spain, France and Italy) and three from North Africa (Algeria, Morocco and Tunisia).

Particularly, it recognizes an important role to marketing and intermediary links, as well as to the public sector, focusing on empirical studies on the distribution channels for fresh fruits and vegetables. Added value distribution between intermediaries located in importing countries and local interest groups is taken into account as an indicator of the equity in North/South trade relations. To obtain the results, we will follow a methodology of surveys and personal interviews with the different members of the channel and it will be created a database for analysis. More specifically, the information collected will refer to: production systems, cost of investments in quality and food safety, both specific and imposed by importers and retailers, and consumers' perception

and behaviour data facing health concerns based on the information available at the moment of the purchase.

## 2. WP2 GENERAL OBJECTIVES

The study of this research group shall delve into the organization of the international supply chains. Especially, big importers and retailers will be analyzed, with emphasis on their strategic actions, given that they have a remarkable relevance and influence within the channel and, in particular, on the development and implementation of quality and food safety regulations. The area of influence of such players under examination is the geographic context which the countries involved in the SAFEMED project (France, Spain, Italy, Morocco, Tunisia and Algeria) make up, to determine to what extent the above players determine the characteristics of the commercial fruit and vegetable channel and even the members that comprise it. All that referred to the regulatory framework and quality and safety standards of the products that they offer.

### 3. TASK 2.1 SPECIFIC OBJECTIVES

The work of this first phase focuses on the literature review, with two basic objectives:

- a) Drawing conclusions about the functioning of international supply chains, with influence in the relevant geographic area above mentioned. Particularly on the types of organization as well as general strategies supermarket chains and food safety importers, reflected in the studies conducted so far on this line.
- b) Setting the analytical framework that provides guidance for the development of the next WP2 phases. In particular, the detection of existing gaps, key contributions of the study, survey approach and orientation of the subsequent statistical and econometric analysis.



The work carried out is presented subdivided into two sections:

- General backgrounds and determination of the essential contributions of the study.
- Review of the international chain configuration and implications of participating agents.

#### 4. TASK 2.1. GENERAL BACKGROUNDS OF THE STUDY

In the last years, both the growing concern about the risks related to food safety in the European context, and the increase of the heterogeneity on certifications and types of control adopted in international supply chains, have been the subject of numerous reports and research (for example, Willems et. al., 2005, Lee, 2005; Havinga, 2006; Grazia and Hammoudi, 2012, among others). In particular, the present heterogeneity has been interacting with a number of private level strategies, having supermarket chains and large distributors as main protagonists, such as the strategic option selection of market choice or the strategy differentiation of B2B ('Business to Business') and B2C ('Business to Consumer'), which are applicable to food safety in the fresh fruit and vegetable distribution channel.

This review consists of three sections, the first two focused on the organization of the supply chain and the strategies of the different players in relation to food safety and quality, particularly with reference to fresh food and fruits and vegetables. The third part consists of the limitations and conclusions on the interaction between the two previous issues and their implications in determining health risks and organizational structures of the supply chain.

## 5. ORGANIZATION OF THE INTERNATIONAL STRUCTURES OF FRESH FOOD SUPPLY

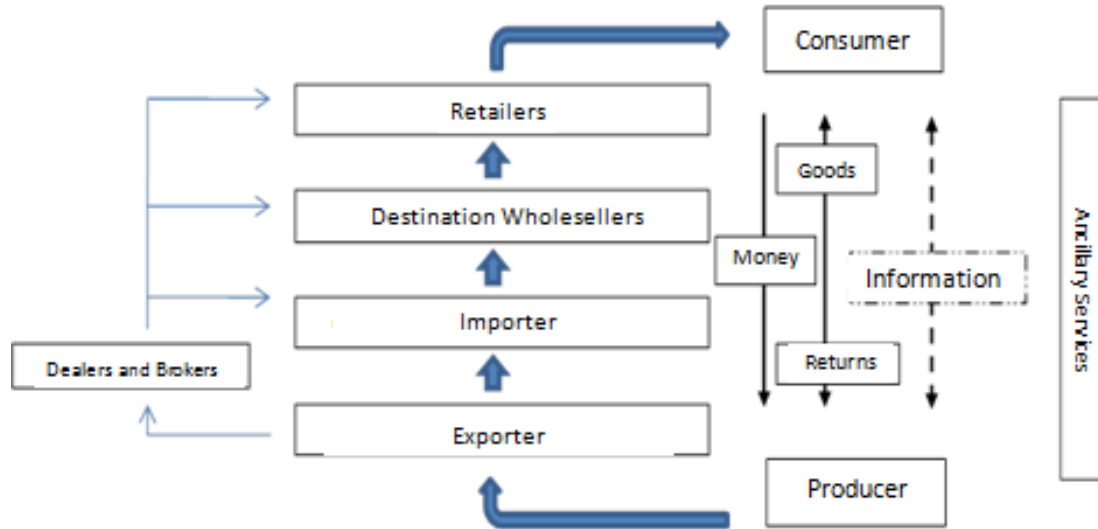
*Table 1 - Summary of contributions on the F&H organization of international supply structures*

<b>AUTHOR (Date)</b>	<b>Scope of the Study</b>	<b>Type of the Study</b>	<b>Specifications of the Study</b>
Boehlje, M., Akridge, J., Downey, D. (1995)	General	Descriptive	Enumeration of 10 changes with implications for the structure and performance of agribusiness.
Zuubier (1999)	France, USA and Holland	Empirical	Factors with influence on vertical coordination in the fresh produce industry.
Codron, J.M., Giraud-Heraud, E., Soler, L.G. (2005)	France	Empirical	<ul style="list-style-type: none"> <li>- Economic analysis of organization of food distribution channel.</li> <li>- Selection of public and private standards.</li> </ul>
Henson, S., Reardon, T. (2005)	General	Descriptive	<ul style="list-style-type: none"> <li>- Development and implications of private standards.</li> <li>- Implications for national and international food policy.</li> </ul>
Willems, S., Roth, E., van Roekel, J. (2005)	General	Descriptive	Study on the costs of compliance with quality standards for exporting developing countries.
Kalaitzis, P., Van Dik, G., Baourakis, G. (2007)	UE Members and southern Mediterranean countries	Descriptive	<ul style="list-style-type: none"> <li>- Description of key trends in the F&amp;V channel in Europe.</li> <li>- Structural elements in the channel of F&amp;V in Morocco, Egypt, Israel and Turkey.</li> </ul>
Lessassy (2007)	France	Empirical	<ul style="list-style-type: none"> <li>- Impact of vertical coordination in the customer-supplier relationship.</li> <li>- Limits to duration of conflicts with producers for the sale price.</li> </ul>
García, R., Pérez Mesa, J.C. (2010)	Almería and its import countries.	Descriptive	Study of the role of large retailers in driving the implementation of biological control in production.
Lee, J., Gereffi, G., Beauvais, J. (2010)	General	Descriptive	Description of the relationship between value chain structure and food safety.
Moati, P. (2010)	France	Descriptive	Description and justification of the process of private distributor label penetration and its reversibility.

Tozanli, S., El Hadad-Gauthier, F. (2010)	UE Members and southern Mediterranean countries.	Descriptive	Structure and classification of global value chains.
Ahn, J., Khandelwal, A., Wei, S.J., (2011)	China	Theoretical	- Reasons for exporting firms to use intermediaries. - Description of the intermediated market characteristics.
Gereffi, G. (2011)	China, Mexico, USA	Descriptive	Market shares transfer between countries within global value chains.
Hamminaz, R. (2012)	Morocco	Descriptive	Adaptation measures for Moroccan local food companies to demands of modern distribution channels.
Latouche, K., Rouvière, E. (2012)	France	Empirical	Roles and strategies of intermediaries in the channel of F&V.
Pérez Mesa, J.C., Galdeano E. (2015)	Spain	Empirical	Influence of collaboration in the profitable of supply chain

Globalization has led to a new era characterized by an increased international competition whose reflection can be seen in the evolution of the global organization of industries and how countries take or lose prominence within them. Global value chains show how the new systems of international trade, production and employment give shape to the future development and competitiveness by incorporating basic concepts as “governance” and “continuous monitoring.” The future of international competition shall show the consolidation and adaptation of global value chains and the identification of emerging economies to continue their improvement in the value added of the product and services within these chains, with an increased focus on domestic and regional market (Gereffi, 2011).

Figure 1 - Players involved and position in the distribution channel of fruits and vegetables.



Source: Own elaboration.

In the particular case of fruits and vegetables, sales channels are divided into two: a traditional channel and a modern one. In the traditional channel producers sell their goods to a wholesaler in origin or destination, arriving later to the consumer through traditional retailers. The modern system means that the producer sells its goods to logistics operators (central or sales platforms) that supply their parent companies: the big distribution. Nowadays the modern channel is imposing on the traditional one.

The retailer offer of consumer goods is specially concentrated in a few hands. This controls the entire supply chain requiring their suppliers some great efforts in promotion and quality that detract from the settlements and that therefore, they result in the income statement of the weakest link: the primary seller. Fruits and vegetables, as poorly differentiated products, are subject, in negotiating with the distribution big chains, at a constant downward pressure: large retailers, because of its broad scope, have the active or even passive ability to encourage competition among their own suppliers, transferring the expertise of the most advanced production areas, always with the purpose of getting cheaper supplies (García and Pérez Mesa, 2010).

At the same time that globalization and reduction of trade barriers lead to an increased international trade in perishable products, the supply chains are increasingly more concerned about the safety and quality of their supplies: for them the ability to react quickly to the problems will be a source of differentiation.

This way, global value chains should deal with traditional challenges such as logistics, flow of payments, packaging and labelling, choice of suppliers, etc., and new challenges, by highlighting food safety that influences collaterally on the aforementioned ones.

Food safety force the members of the supply chain to work together to get a transparency within it which ensures the safety of products for consumers. Within the different supply chains for fresh fruit and vegetables, the measures implemented in this respect differ from each other. According to this differentiation and the level of collaboration achieved, Willems et al. (2005) show the following types of channels:

- Transnational companies that coordinate and control all activities along the supply chain ensuring a high quality safe product under their own brand.
- Producers and companies that work in collaborative supply chains, which are helped by buyers in the implementation of private standards and are provided with information on food safety requirements in public and private countries of consumption.
- The distribution channels oriented to transaction or controlled by importers, in which producers and importers sell their products through intermediaries, being so disconnected from the European market. The collaboration in this case is limited to each commercial operation, not being these suppliers regularly informed of quality and food safety requirements in the consumer countries and thereby running the risk of not meeting these requirements.

The factor of the vertical coordination in the supply chain takes great relevance becoming the identified need that drives these changes and new elements in the relations between players in the chain as adaptive measure of sustainability and improvement of the functions of the channel, and ultimately, the utility created to the consumer.

For example, as Hennessy (1996) argues, the effects of information asymmetry, given the uncertainty regarding the nature of the quality of the products in the hands of suppliers, and the problems to have available such information may be the reasons of the development of vertical integration processes in order to meet the new market demands.

Nevertheless, other players also influence vertical coordination systems of the food industry. Among others, Zuubier (1999) notes that the relating to the specific of every type of industry and these based on the company resources would be the most prominent, while the differences between product categories and institutional environment do not ponder too much on this channel coordination.

But we can not forget that its members are after all these actions and strategies within the distribution channel. Traditionally, with a basic role, as producers, exporters, importers and retailers, but also others, such as dealers, brokers and platforms, whose role reveals very important in vertical stress situations in the channel due to information asymmetries or elevation of quality and safety demands from customers.

Following the direction of the goods through the channel, we find the producer as the first link of the chain. He/she, as principal shareholder of the value creation of the product in its formation, acquires a fundamental role in the quality and adaptation or not to the subsequent health and hygiene requirements imposed by third parties for marketing. His/her work in this area is crucial because once the fruit is produced it will not be possible any modification or adaptation to any standard or restriction that must be overcome.

Exporters are the natural next step from the farmer, except for cases of direct export and vertically integrated companies, and they may also be producer groups involved in the handling or manufacture.

The wholesaler at destination is the intermediary nearest to the supermarket chain in the natural sense of the supply channel. In many cases, he/she turns out to be the interlocutor with the rest of the channel to the producer regarding the implementation of the requirements demanded by the supermarket.

The retailers' position (highlighting supermarkets chains), as the last client in the supply chain, gives them the power of choice of provider to stock products that they will sell then to their customers, consumers, whose loyalty will maintain through prices and differentiation policies. These commercial techniques are what mark their strategies facing suppliers, imposing them protocols that will maximize this differentiation in quality and minimum prices.

In the case of intermediaries, their role is to disseminate market information and connect buyers with sellers (Latouche and Rouviere, 2012). Although the Internet has

drastically reduced the costs of choice, giving consumers the possibility of comparing quality and prices, and information being more available than ever, intermediaries continue to maintain their activities, particularly in the fresh food market which justifies the importance of its adding value. However, the more dynamic and productive local businesses are, there are more predisposition to direct export or import. Market intermediaries involved in operations of less productive companies while the less profitable ones are still in local markets (Ahn et al., 2011). The precise distinction between these players (Belleáamme and Peitz, 2010) is that a dealer purchases merchandise at wholesale prices for reselling it at a retail price, a platform is a system to connect buyers and sellers for a fee, while a broker do not acquire the property of any product, but he/she only charges a commission of the total value offering imported products at wholesale prices to both retailers and wholesalers.

On the other hand, retailers who perform direct import have the particularity to purchase products at wholesale prices and sell them at a retail price in their own chain of stores. These operators make available to consumers both goods imported by themselves and by brokers.

Given the progressive weight and power acquired in the last years by retailers through, for example, the reduction of their number resulting retailers of a larger dimension and market share, and the succession of public health events that have changed the perception and involvement of their customers (consumers) about the life of the product (from the production stage to retailing) that they purchase, the consumer's relationship with the retailer and, therefore, the strength of turnover of this latter one has been affected, which has prompted him to impose new strategies within the supply channel to increase the quality and food safety guarantees given to consumers, for example, by introducing own brands and labelling and certifications of quality. Because of this position mainly acquired by retailers over the other members of the distribution channel, the authorities have had to punish several companies to reduce the negative effects of an excessive domination of distributors over producers.

Value creation and the signaling of the generated value through labelling and quality certifications involve a closer cooperation between retailers and the other players up from the consumer to the producer. According to Codron et al. (2005) we see that both retailers and consumers are opting for this type of private labelling versus minimum public quality standards that are considered as insufficient. Therefore,

through their brands, distributors, looking for reassuring their customers, try to communicate the supplementary guarantees which these signs bring. This leads to profound changes between distributors and the other agents of the channel, since these pass progressively from negotiating the conditions for each purchase transaction with their suppliers to agreements determined a priori by specific time periods and they incorporate both prices and quality and/or health control certifications, since the image of confidence of dealers goes through the mastery of all these aspects of the product.

But the implementation and development of the coordination systems necessary to achieve the “common” food quality and safety objectives are not exempt of difficulties and frictions. Agreements within the supply chain are fragile due, for example, to changes in the environment and the simultaneous pursuit of competitiveness for all players involved. Learning processes, specialization and development of inter-organizational powers are clues that allow us to understand the evolution of large retail chains. Regarding large structures such as supply chains, where take place disparate strategies and limited resources, the existing imposition of the large retail strategies only can be framed as a differentiation factor. In fact, it happens that, for example, there is incompatibility between a low prices policy and the pressure coming from pre-established agreements with guaranteed minimum price (Lessassy, 2007).

This differentiation desired by part of the large distribution finds its main support in the labelling of their products with own-brands, which, along with the consumer’s increased engagement in the life of the products that they consume, have motivated that many dealers start defining their business object not anymore as a purely industrial perspective, but within from a more market-oriented one. Although authors such as Moati (2010) believe that the concept of own-brands involve a variety of ways, they hold a common point: the brand or label adds to the product the support of the image of the distributor that, in fact, exploits the marketing monopoly. In addition, it is estimated that the rapid penetration of own-brands in the food market, even though it is due to current factors, that mainly attests the production of a new market architecture accompanied by a redistribution of roles and links in the value chain between the sphere of industry and trade, expecting, for that reason, major restructuring within agrifood industries (Moati, 2010). The progressive awareness of the structural nature, of the fact that own-brands gain importance and the new market architecture that it involved emerge, could lead to more radical adaptation strategies that can lead to new business

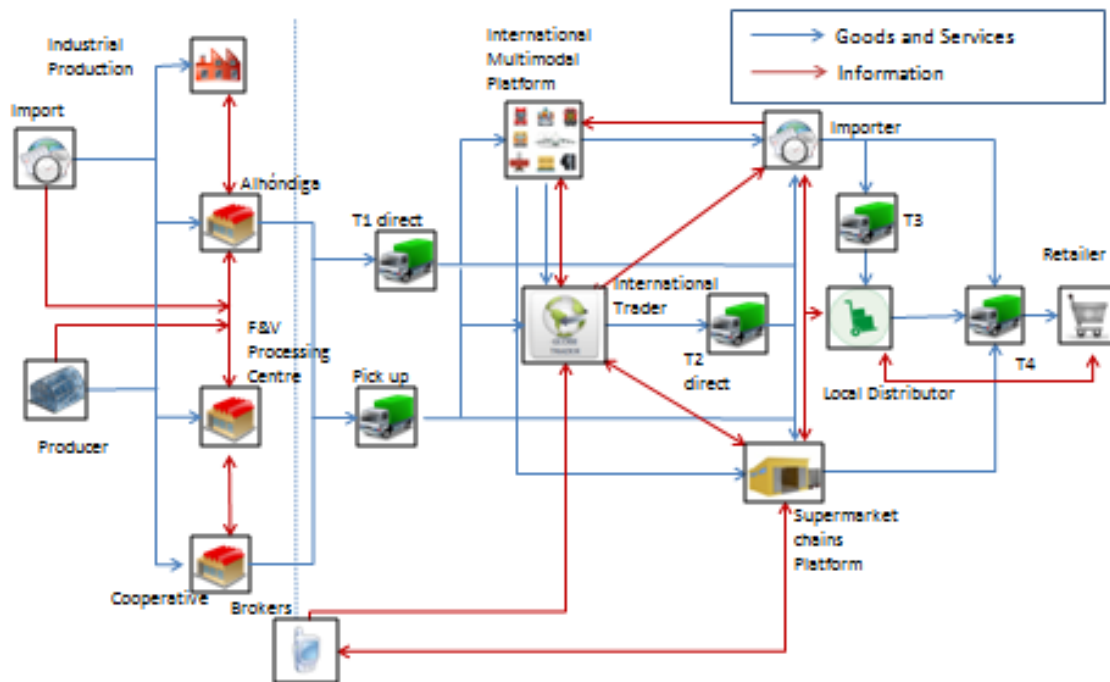


models and to the initiative by the associated producers of not letting more strategic components of the value chain in the hands of the distribution.

In addition, it should be noted, within the new systems which integrate the supply chains, that the phenomenon described concerning white brands has favored the emergence of large international groups, little known to the general public, specialized in producing on behalf of third parties (Moati, 2010). A number of small and medium companies specializing in specific highly differentiated products shall manage to find their market in this new context offering to distributor references that will enable them to enrich their niche product offer. The main victims of the ongoing evolution are medium-scale players whose brands lack the necessary strength to compete with distributors' brands.

In this scenario, where new *modus operandi* are imposed to members of the supply channel and costs for compliance are incurred, the operators that result especially affected are those located in developing countries seeking to enter markets whose distribution channels are under the effect of the imposition of certifications, standards and quality standards. That supposes for them necessary organizational changes.

Figure 2- Detailed diagram of goods, services and information flows in the distribution channel of fruits and vegetables (excl. returns).



Source: Own elaboration.

In the case of the countries involved in the project SAFEMED it is no different. Thus, in most of the countries of the southern Mediterranean, the structures of the supply channels of fruits and vegetables are in a stage of transfer of government-controlled institutions to increasing private participation structures. So far, exports are being carried out essentially through independent commission agents that operate on request and to wholesalers (who serve others wholesalers in importing countries or purchasing centers of supermarket chains), as well as other major agents who apply modern supply management methods. A high percentage of exports are carried out by specialized packer warehousemen. These companies are the best equipped ones to properly be part of the great European distribution channels and meet their stringent quality protocols as well as their logistics and marketing demands. These large exporting companies can address requirements for certification and implementation of traceability systems while others of lesser dimension will face increasing difficulties to access European supermarket chains that currently impose such requirements (Kalaitzis et al., 2007; Hamminaz, 2012). Although most southern Mediterranean countries (largely with European funds) have begun to undertake large investments to respond to

these restraints, it is unknown to where the additional investment should go due to the large structural needs of these areas (number of existing small-scale farms, low training and guidance to the domestic market).

Thus, local firms increasingly are inserted in supply systems of large distribution companies that permanently reconfigure the way they work. These large customers, reinforced by his great power within the channel, through the application of their own rules and standards have enlarged their area of influence beyond their national borders and have emerged as key players in global value chains. A good example is the export of Moroccan fresh tomato for the European market, which shows clearly this change in the management of local companies matching with a growing role of the European agrifood companies.

However, taken as a single dimension the increasing governance of global value chains by large companies is not sufficient to explain all of the changes in local companies that are part of chains (Tozanli and El Hadad-Gauthier, 2010). We should also consider that the socio-institutional dimension (institutions and commercial foreign policies implemented by the importing country) has an undeniable impact on the organization and coordination of local businesses. These local companies as a means to get to have greater power of decision and marketing margin, should devote their efforts to research and development of new varieties and get partnerships among players in origin.

Described up to here the situation of the supply channel, we should now ask, to what stage are we headed? According to Boehlje et al. (1995) there are important changes that are affecting the management of agribusiness companies from provisioning, and through operations management, finance, sales and marketing, to reach the final consumer as:

- Globalisation
- Environmental regulation
- The size and scope of the company
- Adaptation and market niches
- Reduction of agents in the supply chain
- Phenomena of integration, coordination and investment in social capital
- Reducing the number of suppliers by customers.

- Increased coordination of sales and financial departments
- Modification of the asset structure
- Evolution towards transnational companies

To give perspective to this review and having into account the importance of the influence of the intrinsic effects of food safety within the distribution channel as well as an introduction to the later section (on strategies of players in the supply chains of fruits and vegetables related to food safety and quality) is important to mention the relationship between the structure of the value chain and the quality and food safety standards.

The increase of private standards has led to a debate as to whether these standards act as a entry barrier for small players and prevent poverty reduction in developing countries (which has led, for example, to the creation of GAP LOCAL to favour that small producers without resources can adhere to good practice protocols), because retailers play an essential role in most of the non-traditional agrifood channels. Since the impact of private quality standards are often limited to certain specific products and areas, the global agreements to regulate agricultural trade at a global level should be measures that must be undertaken to protect small players in the global chain from the whims of the market and to supplement the private governance schemes (Lee et al., 2010).

However, despite the growing importance of private governance in the global economy, public institutions continue to play a role in agrifood chains.

We can conclude this section recapping that even where there are effective public food safety standards, the private ones tend to be more demanding in their assessment requirements, achieving so a defense system and limiting their exposure to penalties by public authorities and consumers. Even though the imposition of these standards results effectively an entry barrier for exporting companies in developing countries, on the other hand, as we are revealed (Henson and Reardon, 2005), transmitting to the consumer in developed countries that private standards go beyond public regulation, convinces consumer to buy products from developing countries who would otherwise think that they have less control and health quality. This causes a major positive impact on the global flows of agrifood products.

Private standards have been established in order to increase profits through product differentiation, providing, in this way, incentives to providers to affront investment in specific assets as well as to focus to consumer to satisfy the desire of this consumer to have a high variety of products that can be purchased in supermarkets or traditional distribution channels.

All channels, to a greater or lesser extent, use private standards to reduce costs and risks in their supply chain. The largest decrease of these costs comes from the introduction of standardized processes to coordinate supply systems.

The purpose of this review is not to enter deeply into the trends developed in the literature referred to food safety in the distribution channels for fresh food (especially fruits and vegetables) but to try to reflect a broad perspective including the most important of these trends.

In the next section, we will go into detail regarding the active part taken by the different players in the supply chain in response to the existence of the private quality standards of tacit mandatory requirements.

## 6. PLAYER STRATEGIES OF FRUIT AND VEGETABLE SUPPLY CHAINS IN RELATION TO FOOD SAFETY AND QUALITY.

Due to the important changes that are happening on the consumer side and within the agrifood industry (Valeeva et al., 2004; Johannessen et al., 2009; Gouin and Cordier, 2001; Raspor 2008, among others), new areas and challenges are necessarily being faced. In search of the return optimization, sustainability and conflict minimization that involve in achieving these challenges, prevailing the quality and food safety standards as the main tool, the channel players have had to take on new strategic and operational tasks.

Within the wide range of possible strategies reactive to the establishment of new forms of management and activities that involve the application of standards (mostly private) along the agrifood supply chain, in this section we will reflect the most relevant and studied ones in the specialized literature.

### 6.1. General strategies for food safety and food risk management

Table 2 - Summary of contributions with strategies for food safety and food risk management in the channel of the F&V.

<b>AUTHOR (Date)</b>	<b>Scope of the Study</b>	<b>Type of the Study</b>	<b>Specifications of the Study</b>
Mitchell, V. W., McGoldrick, P. J. (1996)	General	Descriptive	Risk reduction strategies towards consumer.
Ziggers, G. W., Trienekens, J. (1999)	General	Descriptive	Role of vertical coordination arrangements within the distribution channel F&V.
Valeeva, N.I., Meuwissen, M.P.M., Huirne, R.B.M. (2004)	General	Descriptive	- Description of the Food Safety management along the channel F&V. - Methods for assessing the benefits of improving the Food Safety.
Gorris, Leon G. M. (2005)	General	Descriptive	Definition of "Food Safety Objective" and "Process Objective".
Starbird, S. A. (2005)	General	Descriptive	Contracts design to improve product safety in the channel of F&V.
Starbird, S. A., Amanor-Boadu, V. (2006)	General	Theoretical	Model to determine the expected cost to the supplier for food safety incidents.
Starbird, S. A. (2007)	General	Theoretical	Model to determine the relationship between the quality and quantity of F&V analysis and opportunities to choose appropriate suppliers.
Starbird S. A., Amanor-Boadu, V. (2007)	General	Theoretical	Application of principal-agent model to the selection of suitable suppliers.
Houghton, J.R., Rowe, G., Frewer, L.J., Van Kleef, E., Chryssochoidis G., Kehagia O., Korzen- Bohr, S, Lassen J.,	Eastern Europe	Descriptive	Study of how to manage health risks and how well it is done within the channel of F&V.

Pfenning U., Strada, A. (2008)			
Akkerman, R., Farahani, P., Grunow, M. (2010)	General	Descriptive	Review of food distribution management from the perspective of operations management and its relationship with industry challenges.
International Commission on Microbiological Specifications for Foods (2010)	General	Descriptive	Description and application of the "Food Safety Objectives" and "Process Objectives" in the channel of F&V.
Giraud E., Grazia, C., Hammoudi A. (2010)	Developing countries and its import countries.	Theoretical	Development of a model to analyze the rationality of the strategic decisions of importers considering food safety requirements for F&V.
Banati, D. (2011)	European Union	Descriptive	Description of techniques such as "risk analysis", "separate estimation of risk" and "risk management" to manage consumer confidence.
Dzifa Mensah, L., Julien, D. (2011)	United Kingdom	Empirical	- Description of the evolution in Food Safety regulation. - Analysis of the response of manufacturers to the regulations based on their size.

First, for asserting how this management is performed, we must consider that food risk management (FRM, hereafter) is a complex matter, showing the importance of food-related processes in our society. From the consumer perspective, health is not the only criterion to judge the quality of the GRA, but other environmental factors as well as others of psychological type ones influence too. Fundamentally, each interest group has its own perspective of the quality of the FRM and how it could be improved. In addition, these different points of view can be addressed. Putting together this spectrum of views within a regulation is an arduous task for the public authorities. In parallel, there are difficulties in measuring the effectiveness of the FRM practices in different dimensions such as the level of protection achieved, transparency and openness to other players involved and interests of consumers. The GRA improvement goes through a

commitment of public and private players. It has been shown (Houghton et al., 2008) that a larger public discussion of the values applied in the FRM can have a positive impact on consumer confidence. However, the consultation and involvement of the different interest groups in the FRM has negative implications in the decision making process being able to slow it down to a larger extent. This last scenario would be unwise facing a hypothetical crisis. For this reason among others, incorporating the point of view of consumers and other interest points in the GRA or at certain levels of risk analysis presents an important challenge, which together with social, ethical and cultural aspects can be an impediment to the development of a general approach to the framework of food safety policy. Perhaps the response is that the participation of all these stakeholders should be assigned to specific issues and, above all, in situations where scientific uncertainty is high or where their participation is crucial. However, the lack of a concise definition of what represents an “effective” participation of consumers in the FRM makes that the benefit-cost ratio of this involvement is not fully described (Rowe and Frewer, 2005).

It is a confirmed fact that, after the series of food safety scandals of the past decade, consumer confidence has been degraded and that both European policy and legislation and food safety system have changed accordingly. Despite the fact that food has never been more secure, it seems that consumers are now more wary, reagents and increasingly critical with the quality of their diets. The introduction of new principles such as the framework of risk analysis, the separation of risk assets and the GRA provide a more efficient and scientific system to Europe with the ultimate goal to recover that lost confidence (Banati, 2011).

Thus, Gorris (2005) tells us of how the concept of food safety has been proposed as a target for the operational FRM in a flexible way in order that different distribution channels and members within those channels can reach equivalent levels of safety. This concept serves to better synchronize the GRA with public guidelines on issues such as the suitable level of protection. The food safety concept articulates the common goal of the supply chain including all their relevant internal links. Objectives and assessment criteria have been two new concepts proposed to complement the GRA with systems and control measures. This entire framework helps public Authorities to give a reference to the distribution channels regarding the minimum expected health while serving private players to design their own systems and standards.



The International Commission for Microbiological Specifications for Foods (2010) goes further arguing that both the concepts of food safety objectives and assessment objectives are added to the already existing programs of good practices (GAPs), good hygienic practices (GHPs) and analysis of critical points (HACCP) that becomes the means for achieving the security and assessment objectives. The new FRM approach provides an operational flexibility which is very important when you have to establish the most effective control measures within a given region or operation. The current techniques and tools for the GRA have been developed to relate the behavior of attributes, or the existence or lack of sampling plans, with the level of danger that could be detected with a certain probability (Legan et al., 2001). Many of the food safety issues that we face today are complex in nature, often requiring a global approach of the chain and multiple simultaneous control measures. According to [Stewart et al. \(2009\)](#), the process management based on risk can be still greatly improved through innovation in technological processes, mathematical modeling, etc.

From the consumer point of view, this whole framework described is synthesized in the perception that food will not cause harm when you prepare or eat them in a convenient way. Today food safety is managed with a series of good practices that are the result of the human lifestyle, history and culture. Raspór (2008) distinguishes four dimensions within these good practices:

- the dimension directly connected to food engineering
- the one indirectly connected with research and education
- the one concerning the treatment of foodstuff by the consumer, that is disconnected from the supply chain and whose attitude, understanding and confidence in it should be increased
- the focus of the “good nutritional practices,” which include consumers in the food safety system through permanent communication, education and information exchange

Under the same principle of inclusion of the figure of the consumer as part of the supply chain appears the approach “from the farm to the table” (Valeeva et al., 2004) assuming that getting acceptable levels of food safety requires a greater coordination and collaboration to shed light on the entire process from producers on. This way, obtaining a deeper understanding, in a cost efficient way, of the potential to improve

food safety throughout the entire distribution channel as well as a weighting of profits for the producer, becomes more important.

As part of the FRM we find the response that companies have to give facing the food safety regulation. This has materialized through process-based systems and integrated approaches (subsequently audited by external certifiers) together with performance-based approaches to verify the levels of health dangers.

In practice there is a great agreement between public and private regulation, which has encouraged companies to implement these FRM systems integrated to manage proactively the risks associated with food safety, but complaining that yet the legislation has a clear focus on the consumer regardless of the impact on all the interest groups within the channel and thus forcing the industry to incur significant costs that could otherwise be avoided. However, even though compliance with the law is expensive, the economic and opportunity cost of not comply with is conceived even higher. Dzifa Mensah and Julien (2011) show that there is not a definite influence of the size of the company on the arguments or benefits to comply with food safety regulation, being the improvements in safety products, the commercial impact in the market since the opportunity cost for the effective implementation of them by the competition are the motivations more expected for the implementation of standards. Also, they give the keys to adopt and continuously improve FRM systems in companies, having to always rely on the efforts of all employees. The various stages of the process must have important powers. Companies have three options for development and implementation: a) implement the system by themselves; b) through an external consultant; c) a combination of both. The biggest handicaps for their implementation are financial, infrastructure and personnel.

Figure 3 - Challenges, in order of importance, for the implementation of a food risk management according to the companies.

CHALLENGES	RELEVANCE
Resistance to change from employees	
Lack of technical knowledge and skills of employees	
Lack of knowledge about the requirements	
High cost of development and implementation	
Inadequate infrastructure to validate and verify the system	
High cost of staff's training	
Lack of culture of responsibility	
Rapidity of changes in the regulation	
Lack of access to necessary and adequate information	
Lack of institutional support	

Source: Adapted from Dzifa Mensah and Julien (2011).

Other more specific types of response by the channel players to this growing attention to food distribution channels are described by Akkerman et al. (2010) leading us to more operational areas such as logistics (where the control of the temperature variable is essential) and the strategic and tactical design of the chain (which profoundly affect product safety, since it determines the number of players and the extent that the product must go over). It is remarkable the notion of incompatibility that it gives us among values coming from sustainability and food safety, as may be the case of energy consumption to maintain low temperatures in the products and the pollution produced for it.

Illustrating the issue from a more strategic prism Giraud et al. (2010) they carry out an analysis of the rationality which bases on the strategic decisions of importers about the international agrifood markets in the presence of food safety standards. So, they show how these operators adjust their supply volumes to market opportunities. These actions have their impact on developing countries, especially as they describe to us in the geographical area under study by the SAFEMED Project that can benefit or be contrary to their interests. More considerations to the same effect will be discussed in the later section on strategies concerning exporting countries.

Given the large number of new activities to develop and inter-relationships that arise among the channel members to comply in a voluntary or mandatory way with the new idiosyncrasies related to food safety, they need elements to sustain and provide security to those proceedings. Thus, operators have chosen mostly the contract as the tool not only essential but which can be designed to improve the security of supply, even in scenarios of asymmetric information. Contracts are also used frequently by

managers to exchange goods, services, information and money among the players of the distribution chain (Starbird, 2005).

Given this need for information and certainty, from consumers and transmitted upward through the players of the chain to producers, becomes a key strategy of choice of providers. The diagnostic test gives buyers information on attributes of the reliability, such as food safety or the content in genetically-modified organisms. But this causes, for example, that mistakes in the testing mislead the purchaser and lead to adverse selection problems. The ability to distinguish and separate food suppliers capable of delivering safe food on what it does not usually depend at the end of the accuracy of these tests. The study conducted by Starbird (2007) tells us about the issue by concluding that there is a maximum error level below which uncertain providers are not much disposed to create a utility that maximizes the price offered by the buyer. The maximum error depends, among other things, on the possibility that the provider's merchandise is not safe and the cost of producing or acquiring an unsafe batch.

Understanding this relationship helps managers when designing the contracts referred to above, the Administration in its regulatory development and discourages unsafe providers.

As also Starbird and Amanor-Boadu (2007) say, it would be one of the explicit objectives of the food safety conditions included in contracts. Thus, the contract is increasingly present in the channel, allowing totally let specifications set on product attributes, of course, including health. It gives that even being possible to do a contract including provisions on traceability and the rest of controls, the motivation to not select unsafe providers will depend primarily on the amount of costs in case of incidence and on the proportion of these costs which affect the provider.

This does not exclude that one of the objectives of traceability is encouraging vendors to be safe. Returning to the above matter, the incentive power of these techniques goes through the accuracy of inspections, the fact of not passing the inspection, the cost of raising an issue and, as already mentioned, the capacity that these costs affect the supplier. Studies show that when non-compliance costs may be charged to suppliers, the level of control by the buyer becomes minimum Starbird and Amanor-Badou (2006), although it is given only in this case.

We see how the characteristics specific of production and the market within the distribution channels are deep vertical coordination determined by vertical coordination in order to gain competitive advantages. We also see that quality systems become a backbone channel as synchronizer factor and that the current competitiveness of the food supply chain is caused by the capacity of creating successful intra-channel relationships. The implications for the distribution channel are the existence of a wide variety of business relationships characterized by a high level of commitment and confidence, as well as higher entry and exit barriers (Ziggers and Trienkens, 1999).

Considering consumers as part increasingly involved in the distribution chain and last link of it, this group also has the capacity of employing strategies to reduce the risk of their purchase operations (valued in damage to their health). The concept of perceived risk is essential to understand the consumer’s buying behavior (Mitchell and McGoldrick, 1996).

**6.2. Strategic positioning to affront the regulatory framework.**

*Table 3 - Summary of contributions on the positioning of companies to address the regulatory framework in the channel of the F&V.*

<b>AUTHOR (Date)</b>	<b>Scope of the Study</b>	<b>Type of the Study</b>	<b>Specifications of the Study</b>
Caswell, J. A., Johnson, G. V. (1991)	General	Descriptive	Analysis of the business response to the demand for products that guarantee food safety.
Eijlander, P. (2005)	Netherlands	Descriptive	Analysis of advantages and disadvantages of self and co-regulation in Food Safety.
García Martínez, M., Fearne, A., Caswell, J., Henson, S. (2007)	United Kingdom and USA	Descriptive	Study of the applicability of co-regulation in the field of Food Safety.
Johannessen G.S., Kofitsyo S. Cudjoe (2009)	Europe	Descriptive	Description of Food Safety regulatory framework for F&V in Europe regarding microbiological aspects.

Due also to crises and health scares in food (due to chemical agents or microbiological contamination), we find in the last years with an increase of the interest and regulatory activity of the Administration at all its levels of decentralization. In this changing scenario, all members of the distribution channel, to be affected, have had to implement strategies to adapt in the most efficient way. In this context, both multinationals and local small companies have been involved.

The approach of the European Authorities, from the White Paper on Food safety (2000), has focused on the development of a European Food Agency, the definition of a regulatory framework that covers the whole supply chain and the improvement of the control systems (primarily on the borders of the Union) and consumer information (Johannesses et al., 2009). More specifically, the channel players are affected becoming, expressly, responsible of the safety of the food that they produce, transport, store or sell. They must also inform immediately the competent authorities if they have any suspicion that their products are not reliable and have the possibility of removing this kind of market immediately, being able to identify any provider of their goods at any time. They are also required to apply an analysis system of critical and control points, having to cooperate with the competent authorities in measures to reduce health risks.

This increased regulatory activity has been generated in a parallel way to consumer pressure on Public Agencies to be more demanding and proactive. Given the limited public sector resources and considering the regulatory impact on the competitiveness of companies as well as the scale of implementation of the measures, there is a multilateral interest in the hand-in-hand public-private co-regulation to have safe food at minimal cost (normative). García Martínez et al. (2007) describe how, within this strategy, fit many initiatives such as self-regulation by the industry, two-way provision of information, education campaigns, labelling requirements, etc.

Figure 4 - Level of government intervention for food safety regulation in the fruit and vegetable sector.

INTERVENTION LEVEL	APPLIED MEASURES
Non intervention	No actions
Selfregulation	Voluntary protocols for the production and standards property of retailers
Coregulation	Regulation and joint action plans with the sector
Information and education	Collection and dissemination of information to consumers
Policy of direct incentives	Promotion of private sector actions to invest in food safety
Direct intervention and control by the Government	Regulation, supervision, control and direct sanctions

Source: García Martínez et al. (2007).

Finding the balance between public and private activity is not easily achieved. To do this, a careful cost-benefit analysis of each guideline must be performed. For example, the costs to ensure the reliability of food may exceed the benefits to be obtained due to the expected increase in retail prices over the utility achieved or received by people, causing with it if possible, a grievance to a greater extent to small- and medium-sized companies. In practice, the impact of regulation varies according to the chain link that the company takes up and the products that it sells.

The probability of detection and severity of the penalty in case of non-compliance, give the players along the channel up to the producer, a strong incentive to impose control systems and, thus, increase the chances of regulatory compliance. Cooperation in the scope of regulation gives rise to various forms of governance such as agreements, conventions and even new legislation (Eijlander, 2005). Briefly, the measures implemented by private players can be:

- definition of quality and food safety standards,
- definition of processes for implementing these standards (more demanding than the rules),
- support and coordination,
- monitoring, control and execution of corrective measures and market protection.

These measures are mainly designed and developed jointly by members of the same level in the channel, which directly contributes to reduce costs, among other benefits. More generally, we can say that companies actively seek to influence the content of the legal rules in pursuit of their interests (Caswell and Johnson, 1991).

### 6.3. Strategic management of communication and labelling in order to maintain consumer confidence

Table 4 - Summary of contributions on strategies of communication and labelling in order to maintain the consumer confidence in the channel of the F&V.

AUTHOR (Date)	Scope of the Study	Type of the Study	Specifications of the Study
Caswell, J.A., Roberts, T., Lin, C.T. (1994)	General	Descriptive	- Description of attributes of Food Safety. - Design of vertical control systems and consumer communications programs. - Economic incentives as a reason of a safer food market.
Roberts, T., Morales, R. A., Jordan Lin, C.-T., Caswell, J.A., Hooker, N.H. (1997)	General	Descriptive	Description of profit opportunities arising from risk reduction associated with food safety.
Caswell, J. (1998)	General	Descriptive	Market effects of consumer perceptions regarding health's attributes, of the benefit / cost ratio of labeling to companies and of regulatory objectives.
De Jonge, J, van Trijp, J.C.M., van der Lans I.A., Renes, R.J., Frewer, L.J. (2008).	Holland	Empirical	Relationship between consumer confidence in Food Safety and companies and institutions.
Trienekens, J., Zuurbier, P. (2008)	Developing countries and its import countries	Descriptive	Description of the Food Safety situation in the food industry.
Johannessen G.S., Kofitsyo S. Cudjoe (2009)	Europe	Descriptive	Description of Food Safety regulatory framework for F&V in Europe regarding microbiological aspects.
Grazia, C., Hammoudi, A. (2012)	General	Descriptive	- Description of the quality standards heterogeneity. - Relations between this heterogeneity and the structure of global value chains.

As a group to what, individually, people belong to both members of the fruit and vegetable sector and external to it, the consumer, through its buying process, determines the price, sustainability or the punishment of a particular company and the strategies



that market operators can applied to maximize their share of it. For that reason they find crucial their analysis.

The food scandals in a number of industrialized countries have heightened consumer concerns about food safety and undermined confidence in the existing mechanisms for controlling this. At the same time, consumers are paying attention to an increasingly broad range of food attributes when assessing the quality of a product, basing many of them on experience and confidence.

However, given the complexity of the production and supply system, consumers must believe in the channel players and the Health Authorities to compensate for their lack of information and knowledge (De Jonge et. al., 2008). This confidence is given in an active form which, by interacting increasingly citizens with distribution chains, they have made that retailers’ quality standards include social, environmental and ethical aspects.

Figure 5 – Characteristics according to the order of valuation for consumer in purchasing fruits and vegetables in the retail network for the EU27.

Quality & Price dimensions	Types of problems experienced with the product	Satisfaction with product characteristics
General satisfaction	Product quality	Competition
Ratio price/quality	Prices	Assortment
Service quality	Service quality	Satisfaction
Consumer protection	Wrong information	Comparability of prices
Payment security	Problems with the retailer	Confidence
Transparency	Cancellation rights problems	
Food safety	Problems with returns	
Comparability of prices	Delivery problems	
Average price	Sales methods	
Comparability of quality	Product’s safety	
Enough range of prices	Contracts, terms and conditions	
Enough range of qualities	Warranty problems	
Accessibility		
Labeling		
Environmental friendly products		
Innovation		
Ethical standards		

Source: European Commission (2009).

Nowadays, a consumer, before buying, needs to expect that the industry provides some social and satisfactory food safety standards. For that reason, end customers show that they want to pay a superior price for products that offer them this security all year long. Both its health and that of its environment are important dimensions for him, wanting to have information on the production processes of the type that he/she consumes (Willems et al., 2005).

The most effective way to maintain and increase this trust is to provide consumer with information on the products. Given the large diversity of all kinds of

information related to the product that is generated from production to consumption, the label, linked mainly to the packaging, is used as support where the buyer can get, in a concentrated way, the knowledge most relevant to him/her (according to the seller), associating the values that the label can transmit to a logo, colour or slogan.

Producers, handlers, distributors and retailers can use the labelling to emphasize the safety of their products voluntarily, by legal action, or by a combination of both situations. The effect on the market depends on the perception of each quality attribute by the consumer, the benefit and cost of labelling for companies and government policy objectives (Caswell, 1998).

As we have mentioned, and given the importance of the consumer confidence, for its study, this variable may be secreted in the sub dimensions that comprise it like, for example, the perceived transparency or the interaction with the channel. De Jonge et al. (2008), through a study of this type, says that a high level of confidence in the players in the channel also results in a high level of satisfaction and peace in their buying process. In fact, it shows that confidence in the food processing agents has a greater influence on consumer purchase intention than the rest of the channel members as well as that the “care” put in this work is the most important sub dimension of this trust. In addition, his research suggests that to achieve the common goal of maintaining a high customer satisfaction with food safety, each channel member should focus its efforts on different concrete dimensions of trust within its communication strategies. The identification of these attributes allows to design effective communication programs for consumers, and to take advantage of large and profitable marketing opportunities (Caswell et al., 1994, Robert et al., 1997).

In the light of the foregoing, from their design stage, private standards are designed to allow companies to take advantage of market opportunities through a differentiation of the product based on quality. This function refers especially to the standards of individual companies towards the consumer (B2C). Apart from their specific objectives, the B2B and B2C approaches differ mainly in their “visibility” vis-à-vis final consumers.

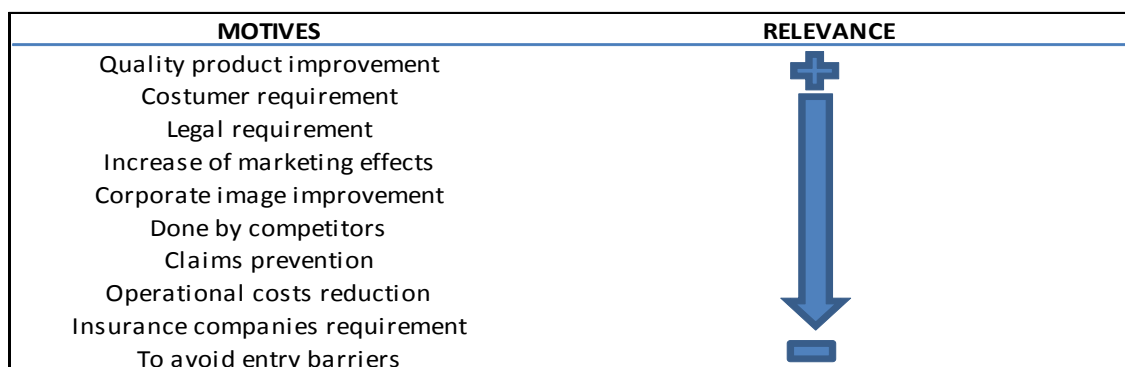
### 6.4. Strategies to develop and evaluate food safety controls

Table 5 - Summary of contributions on strategies to develop and evaluate food safety controls in the channel of F&V.

AUTHOR (Date)	Scope of the Study	Type of the Study	Specifications of the Study
Trienekens, J., Zuurbier, P. (2008)	Developing countries and its import countries	Descriptive	Description of Food Safety situation in the food industry.
Johannessen G.S., Kofitsyo S. Cudjoe (2009)	Europe	Descriptive	Description of Food Safety regulatory framework for F&V in Europe regarding microbiological aspects.
Grazia, C., Hammoudi, A. (2012)	General	Descriptive	- Description of the quality standards heterogeneity. - Relations between this heterogeneity and the structure of global value chains.

The proliferation of quality standards has caused that exporting companies from developing countries encounter problems to comply with these requirements (having to have better controls over their production and distribution), causing also a parallel increase in marginal costs related to accreditation and certification which affects equally to companies in industrialized countries. The combined impact of these effects has proved necessary the implementation of strategies to enhance the value of the ratio cost/effectiveness of the accreditation and certification systems.

Figure 6- Dimensions of motivation to comply with quality standards, in order of importance, according to the companies.



Source: Holleran et al. (1999).

Nowadays, the quality assurance systems developed allow the application of control and verification measures in order to monitor the quality level along each step of the production and trade process both intra and inter-enterprises. Private control systems as well as protocols and certification programs no longer are used only in response to the highest consumer expectations, but, since the quality related to the product is not found anymore, they fit the characteristics of the production and distribution processes (Trienekens and Zuubier, 2008, Holleran et al., 1999).

Today, the three most important generic quality assurance systems in the food industry are the Code of Good Agricultural Practice, the Analysis of Critical Points and the standards of the International Standardization Organization. However, within the wide range existing, standards can be classified into:

- a) Certification systems for sustainable agriculture, where farmers must generate documentation for monitoring and control.
- b) Quality systems based on the sector, usually nationwide.
- c) Quality systems created by the food industry to specify and distinguish processes.
- d) Systems developed by retailers focused on a safe and sustainable production.
- e) Regional or traditional quality systems.

As for the public sector, the interest has also been directed towards food safety controls with special attention to imports at the points of entry to the European Union. Each Member State is obligated to make that competent authorities carry out controls at an appropriate frequency (and whenever there is a warning) to monitor risk.

One of the obligations of operators in the supply channel is to identify and regularly review the critical points in their processes and ensure that adequate controls are applied at these points.

We find specific points regarding the microbiological quality of irrigation water and analysis of some stages of the process including worker hygiene in the particular assessment criteria for fruits and vegetables (Johannessen et al., 2009).

Always, ultimately, if the market does not work “properly” providing sufficient incentives for companies to adopt “suitable” food safety measures, or if the economic

and social cost of such measures is relatively high according to social benefit in terms of increased level on food safety, governments should intervene to make the social level optimum for the protection of consumer health (Grazia and Hammoudi, 2012).

### 6.5. Analysis from the point of view of retailers

*Table 6 - Summary of contributions on strategies related to food safety of retailers in the channel of F&V.*

<b>AUTHOR (Date)</b>	<b>Scope of the Study</b>	<b>Type of the Study</b>	<b>Specifications of the Study</b>
Henson, S., Northern, J. (1998)	United Kingdom	Descriptive	Retailers´ response to the distributor brands risk.
Gouin, S., Cordier, J. (2001)	France	Empirical	Retailers´ Food Security strategies.
Konefal, J., Mascarenhas, M., Hatanaka, M. (2005)	General	Descriptive	Justification of the increase of private quality standards in food safety.
Lee, D.S. (2005)	General	Descriptive	Influence of packaging on food safety
Réviron, S., Chappuis, J.M. (2005)	Switzerland	Descriptive	Analysis of the new food supply chains structures.
Fulponi, L. (2006)	OECD countries	Descriptive	Analysis of reasons that led to retailers to the use of private standards.
Fulponi, L., Giraud-Héraud, E., Hammoudi, H. y Valceschini, E. (2006)	General	Descriptive	Impact of private quality standards on the economic structure of the agri-food supply chain and the improvement of Food Safety.
Havinga, T. (2006)	Holland	Descriptive	Study of the effectiveness of the protection of public health through private quality standards.
OCDE (2007)	General	Descriptive	Analysis and interpretation of trends and challenges in the global food situation.

Garella, P., Petrakis, E. (2008)	General	Descriptive	Modeling the effects of policies on minimum quality standards.
Hammoudi, A., Hoffmann, R., Surry, Y. (2009)	General	Descriptive	Description of the relationships between food safety standards, business strategies and the organization of the supply chain.
Henson, S., Humphrey, J. (2009)	General	Descriptive	Analysis of how and why the emergence of private food safety standards.
PIP (2009)	East Africa and Madagascar	Empirical	Evaluation of compliance status, especially with private voluntary standards, for access to the export markets for the countries in the sample.
Dzifa Mensah, L., Julien, D. (2011)	United Kingdom	Empirical	Study of factors that have impacted the food industry settings in the UK.
Giraud-Héraud, E., Hammoudi, A., Hoffmann, R., Soler, L. G. (2012)	General	Theoretical	Study of incentives for retailers to accept private safety standards.

In the current context of overall supply, the European import and distribution channels demand private food quality certifications to their providers, both from third countries and within the European Union. This requirement is part of a commercial agreement that two players accept voluntarily in the market (Lee, 2005).

But not only the food industry and producers are the ones that are promoting the private standardization in terms of food safety. In fact, in the last years, especially retailers have been playing a very active role in the management of quality and safety in the supply channel. In particular, large supermarket chains have developed initiatives to engage their suppliers in complying with strict protocols. Just a few years ago, security was not an important subject for them. Even supermarket chains did not have food safety programs or *ad hoc* technical departments. Nowadays, it has changed. In the nineties, some of these chains developed their own exhaustive quality protocols including unannounced inspections at production and handling plants. The motivations for addressing this regulatory activity were, on one hand, reducing costs per incident, and, on the other, transmitting confidence to consumers. However, not all supermarkets have developed their own certification system, choosing also to adopt common

standards coming from retailer associations. The application of a common private standard by a large number of supermarkets maximizes pressure on suppliers (within and outside their borders), thus allowing these retailers the choice among numerous certified providers, besides boosting consumer confidence in the supermarket (Lee et al., 2010). A harmonization of food safety private standards generates benefits for both retailers and their suppliers, specifically: legal, technical and financial benefits to retailers. However, on the other hand, although a harmonization of private standards *a priori* seems advisable and desirable, this union strikes strategies and power relations of each supermarket chain vis-a-vis the others.

With strategic perspective, the fact of transferring this pressure to suppliers reduces the cost of its implementation at the supermarket itself. However, we must not forget that retailers hold simultaneously the legal obligation to take reasonable measures and exercise the maximum diligence to avoid quality incidences and health scares, what includes the verification of technological processes in the production of food identified with their brand.

And, since all members of the channel, the retailer is the one that most directly supports the responsibility for food safety vis-a-vis the consumers (especially in the case of having an own label), they transferred this responsibility to their importers and processors through strict quality protocols. This way, in the event that there is a serious problem for health risks, both importers and retailers will be affected from any claim, even though retailers are not directly related to the problem. All these protocols have traceability systems. For example, in the UK, according to the Food Safety Act 1990, retailers are required to exercise the “due diligence” to ensure food safety. This “diligence” protects consumers and at the same time it protects retailers from being convicted in the event of an incidence if they have taken all reasonable precautions to avoid the damage (Dzifa Mensah and Julien, 2011).

The position of the supermarkets as an end customer in the supply chain, gives them the power of choosing a provider to be supplied with products that he/she then will sell to its customers, whose loyalty he/she will maintain through pricing policies and quality differentiation. These commercial techniques are what mark their strategies vis-a-vis its suppliers, imposing them protocols that will maximize this differentiation in quality and minimum price.

This situation is seen with approval from the Administration because it sees how its function of consumer protection and defense is strengthened by the action of private players, such as supermarket chains. The application and development of private standards, in this case for fresh fruits and vegetables, by retailers, has been imposed in all European Union countries, having a very important effect on the rest of the supply chain and the European food sector in general. For example, Dutch retailers have embraced the BRC protocol developed by British retailers and the German ones have created their own protocol (IFS) to what French retailers have subsequently subscribed (Havinga, 2006). The role of supermarkets is so important that differences between safety and quality standards of different countries / markets are determined primarily by private standards imposed by retailers (PIP, 2009).

Supermarkets are the link which joins the distribution channel and the end consumer. This means that they must attend two interest groups different according to the characteristics of each case. To adapt to this, supermarket chains have collective private business-to-business standards and individual private business-to-consumer standards. Thus, each supermarket establishes its equilibrium between the two types giving rise to differentiation strategies based, in greater or lesser extent, on quality (Fulponi et al., 2006).

In both cases, supermarkets give greater management responsibility to the rest of the agents in the channel. However, to produce an effective implementation of a collective private standard along the channel, not only this dimension of responsibility has to exist in it, a large number of operators that result in a decreased market risk must establish a consensus and acceptance of it (Giraud-Héraud et al., 2012). For these reasons, and given that the food safety control for fresh products has become a priority for retailers, most of them choose to deal with suppliers who follow their production, manufacturing and packaging specifications. This practice leads to the setting of long-term business relationships with a limited number of large distributors, becoming it, in some cases, exclusive and being the volume availability, trust and price, the most important variables in this relationship. In addition, the retailer is in a position where he/she can coordinate its activities to ensure the quality (including in some cases even organoleptical properties of the fruits) and health of the products that he/she gets through direct investments in the companies of its suppliers and/or visits direct and



information exchange. These visits happen to be effective tools for building confidence between the two parts (Holleran et al., 1999).

Inclusive multinational companies argue that their safety and quality protocols go beyond the requirements of the supermarkets themselves, and they are aware that their customers buy their products by linking their brand with quality and food safety. These companies control the whole chain and, this way, they can offer additional guarantees.

Due to their particular position and function in the channel, supermarkets require flexibility of supply and rigidity in terms of absence of pests and diseases (unlike the central wholesale markets), developing traceability systems from the plant to the consumer. However, this flexibility is not only unilateral, accepting supermarkets, for example, the compliance with EUREPGAP certification held by a distributor in origin rather than each individual producer (Willems et al., 2005).

Figure 7 - Benefits of meeting quality standards, in order of importance, according to the companies.

BENEFITS	RELEVANCE
Customer satisfaction improvement	
Internal processes improvement	
Increase of quality product	
Compliance with regulatory requirements	
Corporate image improvement	
Staff's morale improvement	
Increased export possibilities	
Process costs reduction	
Insurance premium reduction	

Source: Adapted from Dzifa Mensah and Julien (2011).

Since private standards can provide access to competitive advantages (which partially explains their origin), they can be exploited by leading companies as a competitive repositioning way that can significantly affect competition and vertical bargaining power within the supply chains (Grazia and Hammoudi, 2012). The possibility of obtaining a higher price, based on consumer willingness to pay for a higher level of quality, makes that retailers move beyond public regulations (Garella and Petrakis, 2008; Giraud-Héraud et al., 2006) and they differentiate from each other on quality issues in order to get a large market share. What has so far been clearly

identified is that supermarket chains have continued to increase their interest in learning and even control where, how and by whom fresh products which are supplied are produced (Konefal et al., 2005).

Both retailers and importers make visits to their producer-suppliers in order to verify that the quality of their products and processes corresponds to what they demand. Thus, in the collaborative channels, each supermarket chain fluidly communicates importers and producers of both common and individual standards (example, GLOBAL-GAP) that they demand (which in most cases exceeds the public regulations and include aspects of corporate social responsibility), as the current health regulation.

Similarly, retailers have developed a system of information and early warning exchange concerning food safety incidents (Global Food Safety Initiative) which is useful for them to inform their suppliers, for example, conflicting producers (Willems et al. 2005).

In the light of the foregoing, also supermarket chains set their supply and positioning strategies based on the quality and safety requirements of each country (OECD, 2007). As a result, two predominant forms of private standards driven by retailers in agrifood chains have been created:

- a. Collective private business-to-business (B2B) standards as GlobalGap, Safe Quality Food, etc., mainly designed to provide the business coordination between suppliers to a vertical level;
- b. Standards of individual business-to-consumer (B2C) companies whose purpose is the quality differentiation and, therefore, are communicated to consumers, such as *Field-to-Fork* (Marks & Spencer, United Kingdom), *Nature's Choice/Nurture* (Tesco, United Kingdom), *EQC-Engagement* *Qualité Carrefour* (Carrefour, France), *Gold Star* (BI-LO, USA), etc.

As origin and result of all these changes occurred in the channel we find that the supermarket chains have been leaving behind the competition in the market through intensive strategies of cost and price reduction to pass to strategies based both on prices and product attributes (Konefal et al., 2005).

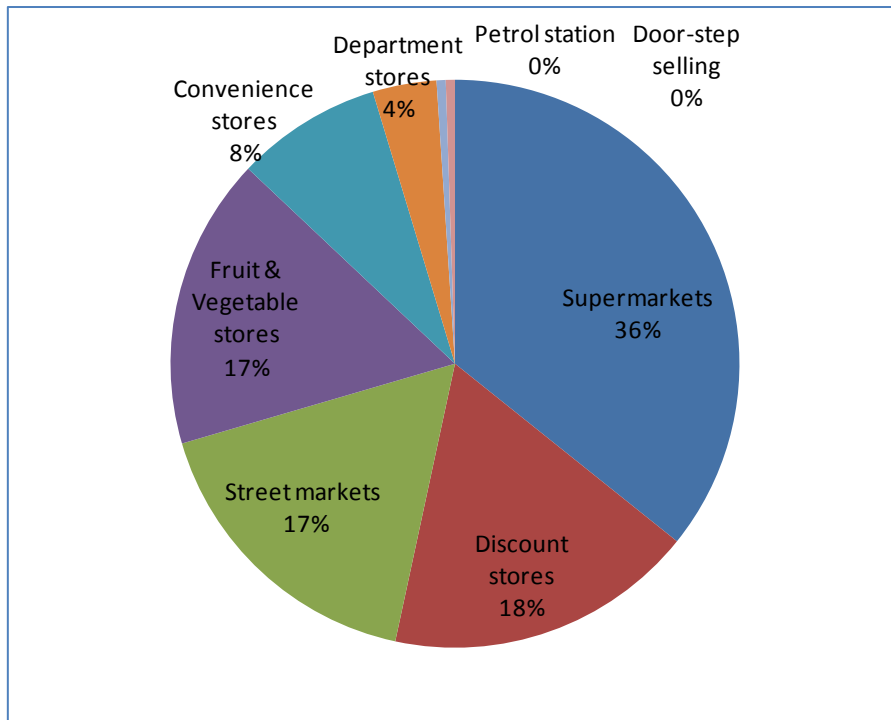
Therefore, nowadays retailers tend to improve their vertical coordination contractually. They worry about their own long-term financial health directly influencing on the safety of the food they sell. Now, even if this is a widespread

practice, it does not imply that all retailers and retailers apply the same strategies and marketing activities, these are subordinated to the type of product and brand (Gouin and Cordiere, 2001). Therefore, with the proliferation of private standards, many decisions regarding public health, food safety and environmental impact risk are daily taken in the wings in the global agrifood system. The operation of the new regulatory regime is moving progressively from the “front stage” where there is public debate to the “back stage” dominated by the large supermarket chains. These chains transnational, increasingly, are going to control what crops are produced, where, how and by whom, being their decision-making process usually opaque. Konefal et al. (2005) study the limitations and long-term effectiveness of a private governance system considering the effect that this would have on various political, economic and social aspects such as justice, full and fair employment and environmental degradation matters. In addition, this governance occurs within a channel that has imperfections such as information asymmetries. However, even in the case of products where the risk of getting a faulty batch is particularly problematic for retailers, they are not looking for creating, in a general way, a system of co-governance directly with producers, a situation that can lead to tensions with these ones (Reviron and Chappuis, 2005). The growing voice of civil society capable of changing regulatory and institutional frameworks, increasing market concentration and buyer power by retailers, as well as their integration in financial markets, has been what has led to the development private standards. This way, while the quality and safety protocols are considered essential to maintaining the reputation and avoid legal liabilities, additional requirements such as working conditions, environmental and animal protection are increasing their importance as a basis for confidence-building strategies of consumer and market share. The basic predisposition on the part of retailers towards harmonization of food safety standards appears as an initial step towards a comprehensive approach to the food distribution management, with the inclusion and equally harmonization of more standards in the future. Given their purchasing power, these movements can be seen as a form of control and governance of the alimentary channel (Fulponi, 2006).

As we see, it is not hard to appreciate today the very important implication of the great distribution in the rationale of foodstuff safety. When the protocols are the result of coordinated action among several distributors, the rules are more in the register of relationships among companies by linking operations carried out in intermediated

markets to comply with a predetermined requirement. When it comes to individual initiatives, they contribute to a better differentiation with respect to competition and promote the market development (Fulponi et al., 2006).

Figure 8 - Distribution of preferences for fruit and vegetable retail stores for consumers in the EU27.



Source: European Commission (2009).

These standards may include requirements in terms of infrastructure, equipment, forms of production and processes, risk management, etc., which are often more restrictive than Law (Hammoudi et al., 2009). Public or private standards not only influence in food safety but also they affect the company internal organization, their strategic plans, and even the own structure of the supply chain. Therefore, they affect the market power of players, the distribution of benefits along the channel and the stability of players. They also affect competition among companies, since the public policy success depends on the companies' strategic response. They also act as entry barriers to the channel.

In the other hand, according to Giraud-Héraud et al. (2012), it is important to note that collective private standards are not developed with the intention of promoting the product or the characteristics of their processes that are communicate to consumers but of ensuring the compliance with the quality requirements imposed by the

regulations and avoiding negative liability and effects on the demand in case of health impact. The motivation to implement these standards it is not to lead to a differentiation in price but rather to protect the reputation and brands of retailers. So there are no differential prices or supplementary added values based to consumer labels. One such standard is only established if there is an enforceable regulated responsibility, so even if consumers respond in front of a crisis by causing a sharp collapsing demand, this may not be enough to bring the industry to implement preventive measures such as the aforementioned quality standards. In fact, these authors show that a more severe protocol does not necessarily lead to a reduced risk of incidence. The reason for this is that the risk of incidence depends not only on the requirement of the collective standard but also on the size of the coalition that develops and implements it, and there can be a negative correlation between the two variables. Whenever the cost in the event of an incidence is high enough, retailers will maximize their profits by adopting the minimum requirement in their collective standards to maintain a complete and stable coalition.

These coalitions, formed by companies, normalization groups and even social and NGOs have created private standards within global value chains related to food safety, food quality and environmental and social aspects of the agricultural production. The implementation of these standards is increasingly controlled by third-party certification. Private standards have made a very big influence on global agricultural food value chains, gradually introduced in national companies and international exchanges. These standards may relate to food safety and integrity of the risk control systems and sanitation, but they can also gaze on other aspects of food production as the source, environmental impact, animal welfare, etc. One of the essential characteristics of private standards, especially those related to food safety is the increased focus on production processes. In this regard, they apply increasingly in a greater extent, rules related to transformation processes in government regulations, as shown when resort, with increasing frequency, to the HACCP system in the Regulations, for example on food hygiene (Henson and Humphrey, 2009).

Making a summary description, we can understand that, parallel to the commercial success for retailers of their image and own brands, the risk exposure related to them has been increased. The retailer reaction has been to seek the system to transfer these risks along the channel to producers through quality systems. Within this

strategy it has become necessary that they support the third-party certification development (Henson and Northern, 1998).

### 6.6. Strategies concerning exporting countries

Table 7 - Summary of contributions on strategies related to food safety by exporting countries in the channel of the F&V.

AUTHOR (Date)	Scope of the Study	Type of the Study	Specifications of the Study
Reardon, T., Codron J. M., Busch, L., Bingen, J., Harris, C. (1999)	Developing countries	Descriptive	Effects of quality standards in developing countries and its corporate strategic responses.
García Martínez, M., Poole, N. (2004)	United Kingdom, France and Germany	Empirical	Study of the impact of increasing food safety requirements of European retailers and their effect as entry barrier for southern Mediterranean companies.
Chen, M. X., Otsuki, T., Wilson, J. S. (2006)	Developing countries	Empirical	Study of how compliance with foreign quality standards affects the development of export enterprises.
Kalaitzis, P., Van Dik, G., Baourakis, G. (2007)	UE Members and southern Mediterranean countries	Descriptive	Analysis of the trends driving the changes that are occurring in the supply chains of F&V and its effect on wholesalers and southern Mediterranean countries.
Tozanli, S., El Hadad-Gauthier, F. (2010)	UE Members and southern Mediterranean countries	Descriptive	Study of the impact of foreign trade policy on the coordination of local businesses.

Integrating into global markets implies a faster potential for growth and poverty reduction in the poorest countries. However, entry barriers to agricultural imports to markets of developed countries have made it difficult that these countries could take full advantage of this opportunity. García Martínez and Poole (2004) describe as the

fundamental structure and the guarantees required by the suppliers required by the European retail chains are one of the biggest entry barriers for the Mediterranean fresh product-exporting countries and, in general, for the developing ones. The long-term solution for these countries which are trying to achieve a continued demand for their products is based on structural, strategic and procedure initiatives to get the confidence of importers/retailers in the quality of their mechanisms to ensure the safety of their products.

Given this brake on export, Chen et al. (2006) they examine in detail how the fact of conforming to private quality standards of client countries affects the activity of exporting companies and how this adaptation is reflected in their propensity to continue exporting and market diversification. Specifically, their results indicate that technical regulations in industrialized countries inversely affect the exporting tendency of developing countries, and so they prove it empirically. In addition, the difference in standards among receptor countries causes diseconomies of scale and affects the decision making about whether to enter these markets or not. Further, they resolve that companies that subcontract components are more limited to comply with these protocols.

Figure 9 - Confluence of requirements in the main manufacturing and marketing protocols.

<b>Management system</b>							
<b>Adaptation programs</b>	}	BRC	HACCP	ISO 22000	SQF	HACCP Holland	IFS
<b>HACCP</b>							
<b>Validation and verification</b>	}						
<b>Protocol for crisis management</b>		BRC		ISO 22000			
<b>Quality management</b>		BRC			SQF	HACCP Holland	IFS

Source: Dzifa Mensah and Julien (2011).

This is due also to the fact that the role of standards has transformed from being a technical instrument for cost reduction in undifferentiated and homogeneous product markets, to be used as a competitive tool in differentiated product markets. The nature of the quality standards has moved from the characteristics of the products to the processes involved with them. In developing countries, these changes have tended to exclude small businesses and farms from participating in market growth, since they need to invest. The responses of the exporting companies in these countries in front of

these changes go through new investments and they include: a) in the case of large companies and multinationals, to create their own standards, certifications, brands and labelling systems, b) for medium-scale domestic exporting companies, to create lobby organizations to governments for them to adopt similar standards for industrialized markets c) for small businesses and producers, to join together with public and non-profit players to create certification systems that allow them to access to export markets and achieve an institutional change in the resulting non-tradable product markets (Reardon et al., 1999; Kalaitzis, et al., 2007).

### 6.7. Incentives and investments to adopt quality standards

Table 8 - Summary of contributions on incentives and investments of companies to adopt quality standards in the channel of F&V.

AUTHOR (Date)	Scope of the Study	Type of the Study	Specifications of the Study
Holleran, E., Bredahl, M.E., Zaibet, L. (1999)	General	Descriptive	Description of incentives to adopt quality systems by firms in order to ensure the food safety.
Segerson, K. (1999)	General	Descriptive	Study whether voluntary initiatives in food safety applied by the supply chain agents carry sufficient consumer protection
Kalaitzis, P., Van Dik, G., Baourakis, G. (2007)	UE Members and southern Mediterranean countries	Descriptive	Analysis of the trends driving the changes that are occurring in the supply chains of F&V and its effect on wholesalers and southern Mediterranean countries.

The competitiveness of food industry companies depends on their ability to adopt production processes adapted to the food safety and quality requirements. Ensuring quality supposes an added cost when carrying out transactions, being there the incentive to voluntarily adopt systems that optimize the management of that risk. While quality systems have the potential to reduce transaction costs by serving as guarantee to the seller, they may similarly serve to overcome market and trade barriers (Holleran et al., 1999).



As described above, the critical importance of investing in systems to meet the standards required by destination markets (especially from the European Union) and to be part of the modern supply chains has led to southern Mediterranean countries to make an effort and reform their food control systems developing new legislation (Kalaitzis et al., 2007).

The food safety policy is currently based on a combination of voluntary measures applied by producers and regulatory measures imposed by the Administration. But, what is the equilibrium point of this combination? How to get to it? Segerson (1999) helps to resolve these issues by stating that in goods for which consumers can not easily detect issues related to health, market forces are unlikely to be sufficient to get adequate protection. In this context, however, the direct regulation of the Administration is not always necessary. The threat of the imposition of mandatory controls (possibly accompanied by financial incentives to undertake voluntary processes) can provide companies with sufficient reasons to invest in food safety with the intention of avoiding those controls. However, if companies do not respond adequately, regulators should be ready to continue their constraints and impose a regulatory system of protection.

## 7. CONCLUSIONS

As part of the phenomenon of the increased international competition and the consequent adaptation of overall supply structures, they are facing new challenges in terms of quality and safety required /offered throughout the distribution channel. This commitment and guarantee relationship makes possible that collaboration and vertical coordination have taken a very important role that affects directly the established links. In particular, changes in the distribution channel of fresh products have had their greatest exponent in the creation, development and implementation of different private quality standards, that usually demand more requirements than legal rules, which in turn have become an entry barrier for companies located in developing countries and with an exporting tendency to markets where certifications of compliance with these standards are demanded by the rest of the distribution channel.

The prominence achieved by these protocols is equally based in the succession of health scares occurred in the consumer market in the last years. Furthermore, this importance is justified since they have been chosen by the channel members, mainly retailers or associations thereof, as the main tool to regain consumer confidence and increase their operating income. To do this, they seek the differentiation of their products compared to their competitors (which does not lead to a difference in price) providing information about products through, for example, their labelling. These players also benefit from the standards as a means to transfer the cost of the implementation of food safety systems and the risk because of their lack of compliance to the rest of the channel up to the producer, getting even to control what is being grown, where, how and by whom.

Consequently, the emergence, promotion and enhancement along the food safety supply chain have brought the need to manage it, and for this they develop techniques to optimize this relationship between the dimensions of the quality attributes, together with control systems, with the probability of detection of risk and danger of incidences. These techniques are materialized in integrated systems (audited by external certifiers) and based on the production, manufacturing and logistical processes to estimate health risk level in each commercial operation.

Simultaneously, facing a matter of public interest such as food safety, the different Administrations have taken an active part by generating new rules, both in an autonomous way and as if they were seeking the coordination and agreement with the

private sector through the co-regulation, self-regulation of the industry, exchange and spreading of information, etc. This has inevitably influenced the management strategies of health risk by companies, becoming dependent on their competitiveness of adopting production processes appropriate to the entire legislation and imposed protocols, since ensuring quality has a cost that is essential to manage and minimize.

In general, it has been observed that most of the literature on food safety focuses on aspects related to quality implementation and management, either generally, or by studying the implementation of specific protocols or standards. A large number of articles enumerates and describes the list of private standards that nowadays concur in different geographical areas. However, there are few which come to the food safety question from a practical market perspective or from the managers' point of view of the distribution channel companies. Although this review shows research results on food safety related to strategic management decisions, such as communication with consumer, exports to developed country markets, adapting the regulatory framework, packaging or production, among others, other relevant areas within business strategy, as the related ones with companies' financial aspects, vertically integrated operations or customer support, remain almost unexplored and they do not reach to reveal themselves as central study trends in food safety. Similarly, there are also few empirical studies that transmit to the business day to day, for their practical verification, the existing theoretical list on the question of food safety.

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