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# **The Cost of Compliance with SPS Standards for Moroccan Exports: A Case Study**

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# Foreword

Food and agricultural trade is the vital link in the mutual dependency of the global trade system and developing countries. Developing countries derive a substantial portion of their income from food and agricultural trade. The emergence of food safety and agricultural health issues and the related tightening of market requirements form challenges to further growth of the mutual gains due to the lack of technical and financial capacities of most developing economies.

As part of a joint program between the World Bank's Agriculture and Rural Development Department (ARD) and International Trade Department (PRMTR), a survey on the Cost of Compliance of exporting developing countries was undertaken. The survey was focused on the supply chains of high-value food products (horticulture, fish, meat, spices, and nuts). The study quantified the costs incurred by both the public and private sectors; identified the coping strategies employed by the various stakeholders in the supply chains; determined the constraints that hinder compliance; examined the structural changes in the supply chain resulting from compliance with the safety standards; and evaluated the impact of these standards on small-scale enterprises and producers. The survey included Ethiopia (animal products), India (fish and spices), Jamaica (nontraditional agricultural exports), Kenya (fish and horticulture), Latin America Southern Cone (animal products), Morocco (fruits and vegetables), Nicaragua (shrimp), Senegal (fish and groundnuts), and Thailand (shrimp and horticulture).

This working paper is one of a series of such case studies that examined the strategies and costs of compliance of the various stakeholders in developing countries with international agro-food standards. This paper was prepared by Omar Aloui (AgroConcept, Morocco), and Lahcen Kenny (Hassan II Institute of Agronomy and Veterinary Medicine, Morocco), with guidance from Cornelis van der Meer (ARD).

A complementary perspective is provided by the companion series of buyer surveys involving representative importers, brokers, retailers, and distributors in the European Union, Japan, and the United States. This series, in turn, discusses the buyers' perception of the strengths and weaknesses of their suppliers and describes the assistance and/or interventions offered by the buyers to their developing country suppliers.

The findings and conclusions derived from these country studies are discussed in a synthesis report that seeks to identify possible points of intervention by the World Bank and other donor agencies and to determine the types of technical assistance that would be most efficient and appropriate. It is hoped that the experiences of these exporter and importer countries will provide useful insights to practitioners in the field, and to national and international policymakers in both the public and private sectors.

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## Acronyms and Abbreviations

APEFEL	National Association for the Producers and Exporters of Fruit and Vegetable
BRC	British Retail Consortium
CAC	Codex Alimentarius Commission
CBD	Convention on Biological Diversity
DGVI	Director in charge of Agriculture in the European Commission
DPVCTRF	Direction de la Protection des Végétaux, du Contrôle Technique et de la Répression des Fraudes
EACCE	Etablissement Autonome de Contrôle et de Coordination des Exportations
EU	European Union
EUREPGAP	Euro-Retailer Produce Working Group, Good Agricultural Practices
FAO	Food and Agriculture Organization of the United Nations
FAS	Foreign Agricultural Service (USDA)
FOB	Free on Board
GAP	Good Agricultural Practices
GPA	Global Plan of Action (Commission on Genetic Resources for Food and Agriculture)
GTZ	Gesellschaft für Technische Zusammenarbeit
ha	hectare(s)
HACCP	Hazard Analysis and Critical Control Points
IFOAM	International Federation of Organic Agriculture Movements
IOC	International Oceanographic Commission (Unesco)
IPPC	International Plant Protection Convention
ISO	International Organization for Standardization
LOARC	Laboratoire Officiel des Analyses et Recherches de Casablanca
MAD	Moroccan Dirham
MRL	Maximum Residue Limit
NTB	non-tariff barrier
OCE	Office de Commercialisation des Exportations (Public Organization for Food Export)
OECD	Organisation for Economic Co-operation and Development
OIE	Office International des Epizooties
PI	Preharvest Interval
PPM	particle per million
QCS	Quality Control Standards
R&D	Research and Development
SODEA	Société de Développement Agricole (Agricultural Development Company)
SPS	Sanitary and Phytosanitary
TBT	Technical Barriers to Trade
UK	United Kingdom
UNCTAD	United Nations Commission on Trade and Development
USAID	United States Agency for International Development
USDA	United States Department of Agriculture

USTR United States Trade Representative  
WHO World Health Organization  
WTO World Trade Organization

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At the official level, the contributions of the Direction de la Protection des Végétaux, du Contrôle Technique et de la Répression des Fraudes (DPVCTRF) director and staff, and the Etablissement Autonome de Contrôle et de Coordination des Exportations (EACCE) staff, especially in Agadir, were critical and helpful.

At the World Bank, the authors thank all members of the project team, especially Cornelis van der Meer of the Agriculture and Rural Development Department (ARD), who revised our preliminary work and brought to bear an experienced point of view and analysis.

# Executive Summary

## Background and Challenges

In 2002 the total value of Moroccan food exports was approximately US\$1.5 billion, or 17 percent of the country's total exports. Citrus is the primary agricultural export, totaling approximately US\$214 million in 2002. Tomato is the second biggest agricultural export, earning US\$110 million in 2002. Because of labor intensity, these subsectors are particularly important in terms of income and employment generation, especially for the female laborers hired in the farms and packing houses. The share in total agricultural employment is 7 percent for citrus and 4 percent for tomato.

These two subsectors have benefited from an array of favorable conditions that explain their long-term growth, including: (1) consumer interest in EU countries for fresh produce all year-round, (2) producers' capacity to transfer and adopt new technologies, (3) preferential treatments in Morocco's access to EU market, (4) consistent macroeconomic management, (5) proximity and insertion in international cold chain logistics, and (6) labor availability and favorable climatic conditions. In this environment, Moroccan food exports have built a relatively good reputation overseas as a result of a serious public implementation of mandatory SPS regulations.

The globalization of competition and consumer protection are probably the main "disturbing" factors and challenging issues in this global picture. The concentration of fresh fruit and vegetable distribution systems in OECD countries is adding pressure and creating a new organizational structure of fresh produce trade. Legal requirements for quality assurance systems and food control along the entire food chain—from seed and agricultural production through food processing and the distribution system up to the consumer's table—are increasing considerably.

## Costs of Compliance Analysis

Compliance with quality requirements, although limited to the usual commercial criteria (size and weight, among others), has been a standard procedure for the majority of Moroccan farmers.<sup>1</sup> The sanitary and phytosanitary requirements are more recent and have increasingly been applied to the production and trade of agricultural products.

## Results at the Farm Level

Farmers have the most difficulty in complying with the issues related to pesticides. Some pesticides are not available in the Moroccan market, and substitutes may not be allowable in the country of destination. Pesticide restrictions and the allowable maximum residue limits (MRLs) vary among importing countries. Moreover, the national system for pesticide registration is slow in registering new pesticides. For some products, the combination of MRL regulations and Moroccan pesticide regulations impedes trade, preventing both producers and traders from entering certain promising export markets.

## Estimates of Costs in a Case Study

The EUREPGAP standard is being widely implemented at the farm level in the Agadir region. Using a microanalysis approach, for a medium-sized tomato farm of 10 ha (ha), the cost to implement the EUREPGAP standard is estimated at US\$51,000 for set-up (buildings and equipment). In addition, annually recurring costs include training, monitoring and surveillance, and certification; and total

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<sup>1</sup> From its establishment in 1965 until 1986, the "Office de Commercialisation et d'Exportation" (OCE) assisted and trained farmers on the issues of trade, marketing, and quality control for the main export-oriented products (citrus and vegetables).

approximately US\$20,000. Relating this estimate to the production costs, compliance costs with the EUREPGAP standard is 8 percent of the total accumulated farm gate costs. After post-harvest, transport, and marketing costs are added, compliance costs represent 3 percent of the total cost.

Large farms have the necessary financial resources and can usually complete the facilities within six or seven months (a maximum of one year). The same task would probably take smaller farms two to three years. For citrus growers, the additional requirement of mobile sanitation and hygiene facilities will result in higher compliance costs. In the case of compliance with multiple standards, the costs are certainly higher, affirming an observation made by a number of interviewed farmers and packing house managers that *differences among standards are, by far, the most serious problem of all*.

### **Results at the Packing House Level**

At the packing house level, no estimates of cost of quality control systems were derived, but observations could be made from the interviews. HACCP is fairly new but has already been integrated in several management strategies. Many managers have noted beneficial consequences from the implementation of ISO 9001: general improvement in the performance of workers, greater efficiency in operations, and cost efficiency as well, due to the reduction in rejections resulting from mishandling of products. In addition, in cases of contamination, the system enables traceability back the source of the problem. In the Moroccan context, there are major problems of compliance with the British Retail Consortium (BRC) standard requirements. The required pesticide residue analysis is not included in the analysis performed by the national government laboratory, and samples must be sent to Europe. The hats, gloves, and clothes specified in the BRC regulations are uncomfortable in the Moroccan weather.

### **Recommendations**

The harmonization of sanitary standards and the adoption of uniform procedures for certification and auditing by systems imposed by different buyers would contribute to the reduction in compliance costs. The Moroccan national system for pesticide registration should be updated to enable the farmers to use the pesticides required by importing countries. The private sector could provide more assistance with farmers' technical requirements, and should be more involved with certification and the auditing process, and laboratory analysis.

Last, a cooperative research and development program on sanitary and phytosanitary (SPS) issues would benefit all stakeholders in the citrus and tomato industries. Donor agencies can assist with programs that educate the farmers and packing house managers on the relevant SPS issues and with building the capacity of small and medium-sized enterprises to comply with the standards and participate in trade.

# 1. Introduction

Significant progress has been made over the last 50 years in lowering barriers to trade, particularly tariffs. However, as tariffs have declined, the importance of nontariff barriers (NTBs) has increased, due to the proliferation of their use as well as a wider recognition of the trade impact of such measures. Recent efforts to regulate these measures have resulted in the WTO Agreements in Technical Barriers to Trade (TBT) and Sanitary and Phytosanitary (SPS) regulations (box 1).

## **Box 1. SPS issues and the WTO: Marrakesh Agreement of 1994**

The 1994 Marrakesh Agreement Establishing the World Trade Organization (WTO) contains a number of annexes, including the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement). The WTO's SPS Agreement does not itself establish standards but leaves this task to relevant international organizations or the member states. WTO member states are encouraged to base their national standards on international standards, guidelines, and other recommendations adopted by the Codex Alimentarius Commission (CAC), International Plant Protection Convention (IPPC), and Office Internationale des Epizooties (OIE).

WTO recognizes the latter group of standards as scientifically founded and compatible with the SPS Agreement. These standards are not legally binding but are used as a frame of reference by the WTO in disputes and cases of arbitration. Whereas these standards cannot be challenged, national SPS measures are challengeable.

At the national level, WTO members may adopt a level of health/consumer protection considered appropriate, provided it does not constitute disguised protectionist measures restricting competition for the benefit of domestic producers. To minimize negative trade effects, all SPS measures must be based on a risk assessment taking into consideration scientific evidence. In cases in which adequate scientific evidence is not yet available, an importing country may provisionally adopt sanitary or phytosanitary measures on the basis of available pertinent information. The measures must be reviewed within a reasonable period of time (precautionary principle).

To ensure transparency, the WTO must be notified of proposed national SPS measures before they are enforced. Disputed measures are discussed in the WTO's SPS Committee and justified objections examined to avoid the need for recourse to the WTO's formal dispute settlement mechanisms.

The WTO SPS Agreement contains two articles that relate directly to the difficulties of compliance for developing countries. It (1) refers explicitly to the possibility of delaying implementation of harmful measures and (2) recommends technical and financial assistance be provided to developing countries to improve their capabilities to comply with SPS standards.

*Sources:* GTZ 2003, [www.wto.org/english/tratop\\_e/spse/spseund\\_e.htm](http://www.wto.org/english/tratop_e/spse/spseund_e.htm).

Consumers in industrialized countries are increasingly concerned about food safety. Governments use a variety of measures to ensure that products are protected from contaminants, toxins, and other organisms that may affect human health. Governments are implementing sanitary and phytosanitary (SPS) measures to protect human health and the health of animals and crops from pests and other diseases that may be transmitted by cross-border trade of food, plants, or animals. In parallel, consumers, retailers, and processors are developing their own quality standards. Exporting food from developing countries is changing from a low-information-content supply chain to a high-information-content one, with implications for all operators involved. Mandatory regulations and private standards are more and more stringent.

Although, in many cases, the functions of standards are justifiable and of great value, they may create distortions at both the national and international levels. The impact of tariffs can usually be estimated from the tariff rate itself. In contrast, the effects of technical standards are more difficult to measure. They are generally embedded in the firm-specific costs associated with the changes required to meet the standards and conformity assessment procedures in different potential export markets. As a consequence,

broad systematic studies of the impact of technical standards on trade are lacking. Much of the available information consists of broad reviews and/or anecdotal evidence based on limited case studies (from OECD or the US Trade Representative, or USTR).

Costs of compliance are the costs that are necessarily incurred by a business to comply with standards. These costs may include adapting the product to meet local requirements and/or undertaking conformity assessment procedures both prior to export and/or at the port of entry. Measures of SPS standards as a nontariff barrier (NTB) can be based on how a given regulation affects the overall equilibrium in the sector, or in the economy. Roberts (1999) proposed an analytical framework to analyze NTBs that summarizes most of what various authors have adopted. It differentiates three economic effects:

1. *Regulatory protection*, that is, the fact that a regulation provides some rents to the domestic sector
2. *Supply shift*, which focuses on the effects of imports on the domestic supply and the costs of enforcing compliance
3. *Demand-shift*, which takes into account the fact that a regulation may bring forth information and increase consumer demand for the product.

How will this growing regulation affect market access by developing countries that export fresh produce? What are the capabilities of developing countries to comply with this trend? What are the costs incurred? What are the benefits? What are the effects on producers?

To answer these questions, the World Bank has initiated a Cost of Compliance for Standards in Trade survey in various countries. In this context, the present authors have prepared a case study on the primary agricultural exports of Morocco—tomatoes and citrus—to analyze their capabilities to meet sanitary and phytosanitary requirements in the context of globalization and new consumer demands.

The aim of this study is to better understand the:

- ❑ Relative importance of SPS standards in developing country exporter-developed country importer relationships
- ❑ Evolving sets of laws, regulations, and private protocols governing SPS and other standards within fresh produce trade
- ❑ Perceptions about strengths and weaknesses of developing country suppliers in meeting these standards
- ❑ Measures and strategies (and their corresponding costs) that private companies are taking to monitor and ensure standards compliance
- ❑ Possible roles of organizations such as the World Bank in assisting developing countries to improve competitiveness of their fresh produce industries.

## **Methodology of the Study**

The website of the Etablissement Autonome de Contrôle et de Coordination des Exportations (EACCE) has a detailed presentation on SPS regulations.<sup>2</sup> The authors also consulted other websites (DGVI of the EU, FAO) to complement their knowledge of basic regulations.

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<sup>2</sup> EACCE is the Moroccan public organization in charge of (1) issuing permits to exports based on technical inspection, and (2) border control of mandatory requirements, including SPS requirements. These activities were assigned to the Ministry of Agriculture from the 1940s and then to the Public Organization for Food Export (OCE) from 1965 to 1986.

The consultants met with export associations to prepare and validate the interview guide. Two interview guides have been used: one for farms and one for packing houses. The authors used a supply chain classification to select their subjects for the interviews (appendix 1). After collecting results from the interviews, they met with the officials in charge of setting regulations on pesticides use to confirm and evaluate the industry needs identified in the survey.

## **Organization**

The rest of the paper is organized as follows:

*Chapter 2* is a general description and analysis of the fresh produce export sector in Morocco, with special emphasis on the citrus and tomatoes subsectors. The sections describe the contribution of tomatoes and citrus to overall exports; and the production, trade, supply chain structure, and specific market access limitations in the two subsectors.

*Chapter 3* contains an analysis of the SPS issues in the citrus and tomatoes markets, including costs and strategies of the various actors in the supply chains. The chapter presents a summary of Moroccan sanitary and phytosanitary regulations and their enforcement and describes the food safety and quality control systems for citrus and tomatoes being implemented by Moroccan exporters.

*Chapter 4* presents the conclusions and recommendations of the study.

## 2. Citrus and Tomato Markets

With 30 million residents, Morocco is a medium-sized economy by Mediterranean standards. The per capita income is approximately US\$1300. Agriculture has been an active engine of growth from the colonial period. Today, agriculture represents approximately 16 percent of Morocco's GDP and 40 percent of the total labor force. The relatively high level of 50 percent poverty incidence in rural areas is explained by the fact that nearly half the population is employed in an industry that makes a relatively low contribution to income.

### Food Exports and European Union Market Access

Food trade is in deficit. Food imports of approximately US\$2 billion per year represent 17 percent of the total imports. Food exports of US\$1.6 billion represent 21 percent of total exports. Moroccan food exports include primarily fresh and processed fish, and fresh and processed fruits and vegetables. Both categories of products are sensitive to SPS regulations.

Traditional fresh produce exports include citrus, tomatoes, and potatoes. More recently, fresh strawberries, green beans, and zucchini have increased their share in total exports. On average, the value of citrus exports represents 18 percent of total food exports, and tomatoes represent 8 percent (table 1). The sum of their export values is, on average, US\$333 million. The export value of these traditional products (in US dollars) is stagnating, and their share in total food exports declining. Labor intensity in these activities explains why, although using only 1 percent of land, their share in total agricultural employment is relatively high: 7 percent for citrus and 4 percent for tomatoes.<sup>3</sup>

**Table 1. Value of exports, 1998–2002 (US\$ million)**

Products	1998	1999	2000	2001	2002
Citrus	259	256	205	208	214
Tomatoes	117	115	87	93	110
Total food exports	1,050	1,006	1,383	1,368	1,494
Total exports	6,861	7,228	7,886	8,067	8,639

Source: Trade statistics, Office des Changes.

### Competitive Advantage

A number of factors give Morocco's products the edge in international trade<sup>4</sup>:

- ❑ Low labor costs.
- ❑ Temperate climate that allows all-year production, especially for tomatoes, with the use of efficient irrigation.
- ❑ Proximity to the EU market, resulting to low transport costs and fresh produce. For the US market, the duration of air travel from Casablanca to the East Coast is comparable to the travel time from California, and relatively shorter than the travel time from competing South American countries.
- ❑ Longstanding trading relationships with European countries, especially France and Germany.

<sup>3</sup> Farm labor intensity per ha is 250 labor days for tomatoes and 50 days for citrus; while for main crops such as cereals, labor intensity is only approximately 10 days (Smith 1996).

<sup>4</sup> Ababouch and Messaho 2002.

- Fairly well-organized trade associations and support institutions allowing economies of scale for marketing and trade promotions cost.

Morocco also faces barriers to the export growth of fruits and vegetables. The most important of these is the rising quality and safety requirements and standards of the importing markets, most especially, the European and North American markets. The sector does not have sufficient and appropriate capacity to fully satisfy these challenges.

### Market Access to European Union

EU imports of fresh vegetables come mostly from other EU countries (67 percent) while the imported fruit trade is divided between EU and non-EU sources (55 percent and 45 percent, respectively). The main EU producing and supplying countries of fresh produce are France, Italy, the Netherlands, and Spain.

The French and other European markets are the traditional destinations for Moroccan fresh produce exports. Preferential access to European markets has been continuous for citrus and tomatoes since the 1960s. However, citrus export markets are much more diversified than the tomatoes export markets, since the former also include export markets in Eastern Europe and the Middle East.

Citrus and tomatoes are part of the agricultural exception regime that is applied in the Euro-Moroccan free-trade agreement established in 1995 and ratified in 2000. In this agreement, agricultural products are submitted to particular protocols that result from bilateral negotiations under the reciprocity principle (table 2). In the first protocol of 1995, Moroccan tomatoes and citrus were granted preferential treatment that included tariff exemptions and minimum prices. It is important to remember that, in the Uruguay Round, EU negotiators had been able to impose minimum prices at the border for major fruits and vegetables. High prices could have excluded major non-EU competitors with Spanish products. The 1995 protocol reduced minimum prices for Moroccan products within limited quotas during limited seasons. The last protocol was signed in 2003. It improved access for tomato exporters from 156,000 tons to 220,000 tons to 2007. The basic reason is that during the 1995–2002 period, exports exceeded the quota level without affecting the European markets. The other reason was the concession made by the Moroccan government on wheat imports. The Moroccan citrus sector has not filled the 1995 quotas and basically maintained its quotas at the level of 1995.<sup>5</sup>

**Table 2. Quotas for Moroccan products in the EU market (t)**

<i>Products</i>	<i>1995 Protocol</i>	<i>2003 Protocol</i>
Tomatoes	156,000 t, October–March	Gradually increasing to 220,000 t in 2007, October to April
Oranges	300,000 t, December–June	Same
Clementines	100,000 t, November–February	Same

Source: [www.eacce.org](http://www.eacce.org).

Recent studies show that Morocco's products are competitive vis à vis its main competitors, for example, with a cost differential of 15 percent of the FOB price between Morocco and Spain for tomatoes and strawberries.<sup>6</sup>

<sup>5</sup> Quotas set in the 1970s were not downsized. Moreover, Moroccan exports were diverted from EU markets to non-EU markets.

<sup>6</sup> Aloui 1998.

## **Export Organization and Integration of Supply Chains**

The Moroccan food export sector has been going through a reform process since the mid-1980s. State monopoly of food exports has been abandoned, and private export groups have emerged. The current organizational framework is one in which the level of integration in the supply chain plays a critical role. The industry is heavily dominated by integrated export groups that control the overall chain from farm to market. The producers in these export groups have access to new imported technology and benefit from the well-trained local labor, know-how and logistics. There are also a number of small nonintegrated farms that are surviving more or less marginally. Newcomers in the industry are rare, especially in citrus, due to certain barriers in the land market.

### **Background**

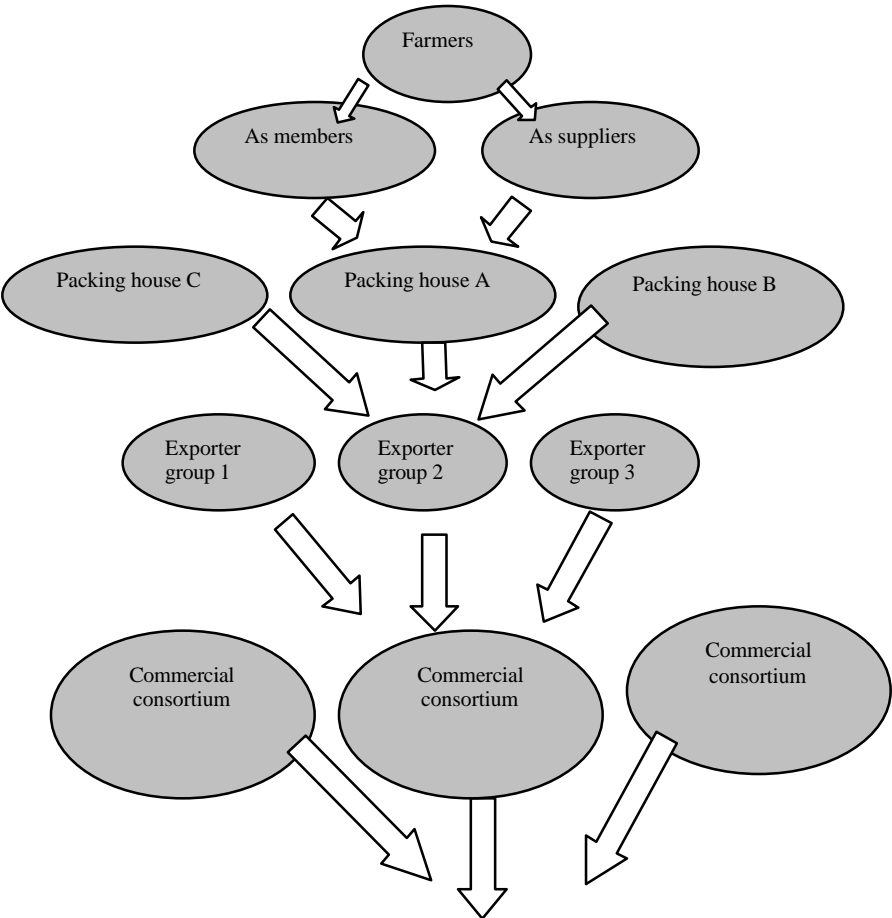
Farming systems in Morocco fall in two basic categories: traditional, with little or no use of synthetic fertilizers and pesticides; and modern, with heavy uses of pesticides and mineral fertilizers, and a relatively high degree of mechanization and reliance on advanced technologies. For citrus and vegetables, the traditional sector is mainly geared towards the domestic market and, only occasionally, exports; while in the modern sector, the main objective is to export.

Prior to 1986, the development of export markets for Moroccan citrus and vegetables was a state affair. A national strategy was adopted in 1965 to boost export of these commodities through the Office de Commercialisation et d'Exportation (OCE), a special body created to assist farmers on the issues of trade, marketing, and quality control for the main export-oriented products (citrus and vegetables); and technical issues such as irrigation, fertilization, and pest and diseases control. OCE's main macroeconomic role was to maximize hard currency earnings from the food sector. This strategy led to the adoption of a farming system based on the intensive use of pesticides, synthetic fertilizers, greenhouses, hybrid seeds, and a variety of modern horticultural practices (planting design, training, pruning).

Besides its main offices in Casablanca and Agadir, the OCE operated through a network of packing houses located in the main horticultural regions: Agadir, Berkane, Beni Mellal, and El Jadida. Many of these packing houses were owned by private farmers, but the OCE had also its own. Thus, farmers were only partially and indirectly involved in market development through OCE, which was the only agent in contact with importers.

Following the dismantling of the OCE in 1986 and the liberalization of the export sector, exporters have emerged as the leaders of the trade and export business of citrus and vegetables. A number of them have developed a network of packing houses that has farmers either as permanent members or as suppliers. Figure 1 presents the levels in the supply chain and the trade relationships among the farmers, packing houses, cooperatives, export groups, and consortia.

Figure 1. Flow chart of the trade relationships in the citrus and vegetable sectors



Source: Authors.

## Typology of Farmers, Packing Houses, and Exporters

Relevant studies show that export activities are organized according to one of three “supply chains”:

1. Integrated channel, in which exporters control their supply and packing facilities from the farm to the market
2. Traditional channel, in which farmers sell to exporters that manage packing houses
3. Semi-integrated channel, in which exporters control only a part of their supply.

This typology has been used successfully to understand strategies and performances in the industry.<sup>7</sup> These studies also show that quality management and marketing strategies will probably differ among the different supply chains.

### Current Situation

There are 21 groups of exporters, 71 packing houses, and 3 commercial consortia in the Agadir area, which supplies 63 percent of the vegetables and 57 percent of the citrus exported. Every one of the exporter groups has its own strategy of marketing and market development. In terms of capital ownership, there are three categories of export groups (table 3).

**Table 3. Categories of export groups operating in the citrus and vegetables sectors**

	<i>Private</i>	<i>Cooperative-like system</i>	<i>Semi-public</i>
Members	Individuals and companies (national and multinational)	Private packing houses and cooperatives	State packing houses and cooperatives
Objectives	Trade and market the owners' production and merchandise Explore new markets Design the marketing strategy	Assist the members on trade and marketing issues Assist members in production and packaging Explore new markets Design the marketing strategy	Assist the state packing houses Provide services for other cooperatives Explore new markets Design the marketing strategy
Examples	Azura, Douna, Armona, NectarPrim, AgriSun	GPA, SORECAP, Delassus, Prim'Atlas	Promagrum, SODEA, OCE

Source: Authors.

## Tomatoes

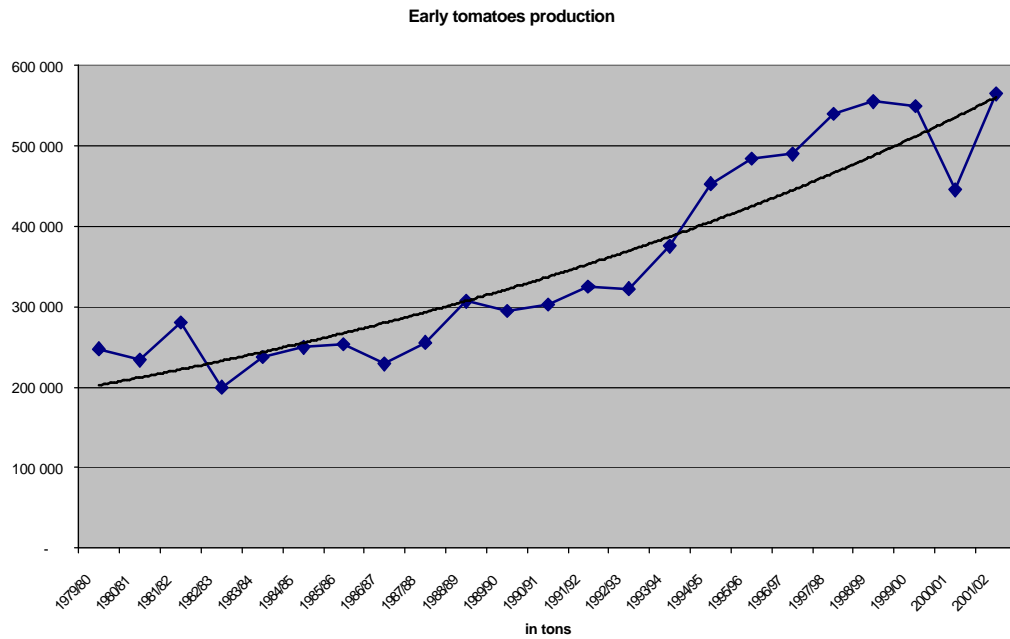
### Production and Trade

Tomato production reaches approximately 1 million tons per year, of which 80 percent is consumed as a fresh produce and 20 percent is processed. The fresh produce is split in two between season tomatoes for the local market, and winter or early tomatoes sold in European markets. Exports have been growing at 5 percent per year from the late 1990s. This steady growth is due mainly to the boom of the early tomatoes industry, which has been growing at a healthy 10 percent per year (figure 2). This production boom is the result of yield improvement per ha (figure 3) due to the adoption of new technologies including new seed varieties, greenhouses, fertigation,<sup>8</sup> and drip irrigation.

<sup>7</sup> The sample used for the selection of interviewees (appendix 1) was based on an updated version of this typology.

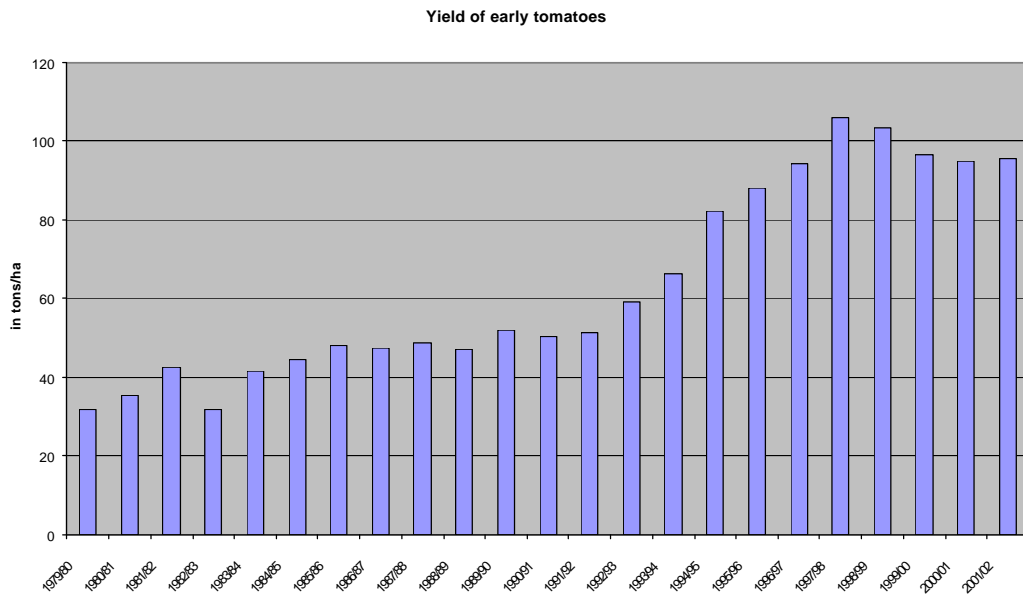
<sup>8</sup> Fertigation is a new technology wherein drip irrigation systems are used to deliver nutrients for crops in a soluble forms.

**Figure 2. Early tomatoes production, 1979–2002 (t)**



Source: Trade statistics, Office des Changes.

**Figure 3. Early tomatoes yields, 1979–2002 (t/ha)**



Source: Trade statistics, Office des Changes.

The main market for Moroccan vegetables is Europe. Export possibilities for tomatoes exist only in winter, when European producers are unable to meet their market demands. Vegetable production during winter is possible under Moroccan conditions in several coastal areas. Moroccan exports have doubled in volume from 1989 to 1999 (figure 4).

The EU imposes a minimum entry price for Moroccan tomatoes that require a larger diameter size with excellent quality.<sup>9</sup> This larger and improved quality tomato is produced mostly in greenhouses and plastic tunnels. Thus, production from plastic tunnels grew from 323,000 MT at the beginning of the 1990s to approximately 565,000 MT in 2002.

Tomatoes trade is mainly regional. Morocco is the main non-EU supplier of the market, but its quantitative share is declining vis-à-vis the Spanish supply based in Canarias and the Almeria regions.

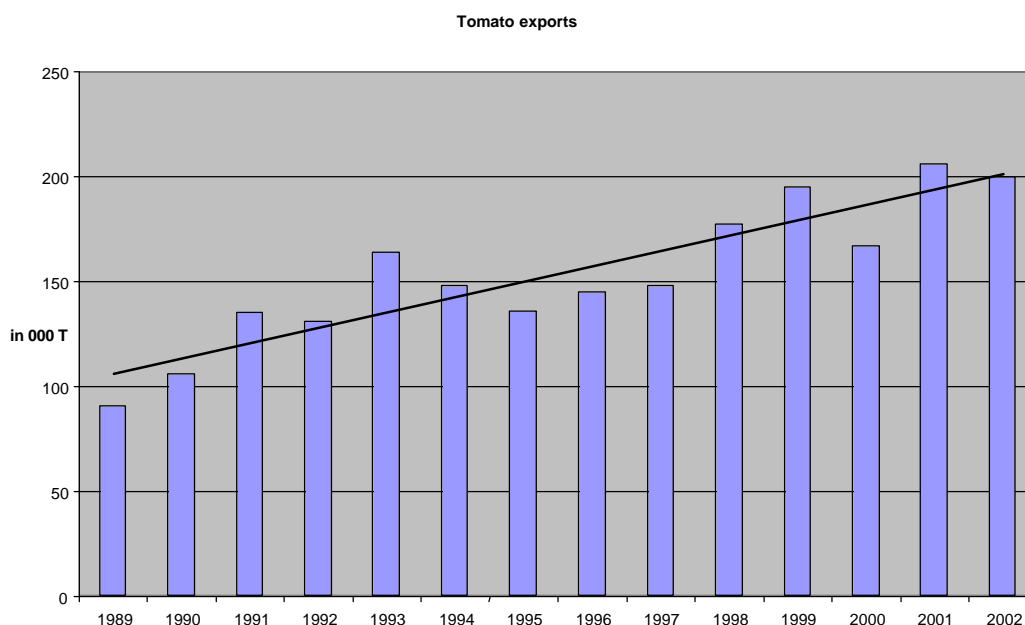
### Supply Chain

*Farmers.* The producers are approximately 10,000 mainly small farms that produce fresh vegetables for export markets on 20,000 ha. Compared to the rest of Moroccan growers, vegetable producers are highly specialized and do not grow more than 4 or 5 vegetable species. Tomato is usually the main crop and uses 50 percent to 70 percent of the land. The rest may be allocated to beans, zucchini, eggplant, pepper, sweet corn, cucumber, or melon. Fresh bean is the vegetable that increasingly is attracting the attention of producers and exporters.

The use of shelters and plastic houses for tomato and other vegetables has helped the farmers to significantly improve the management of pest and diseases problems. For instance, the use of environmentally friendly means (biological control, mesh) has helped reduce significantly the amount of pesticide used against certain vegetable pests and diseases for vegetables.

*Packing houses.* There are 200 packing houses that process vegetables (mainly tomatoes). The packing house is the main interface between farmers and the exporters organized in groups. It constitutes the most critical element in the trade flow linking farmers to foreign markets. Packing house operations are complex and subject to various social, economic, and commercial interactions.

**Figure 4. Growth of tomato exports, 1989–2002**



<sup>9</sup> Humpal and Jacques 2003b.

*Source:* Trade statistics, Office des Changes.

From an ownership point of view, there are three types of packing houses: private, cooperative and state-owned. Due to the flexibility in the decisionmaking process, private packing houses and cooperatives are developing a more aggressive marketing strategy. They are always the first to introduce new technologies and implement sanitary and phytosanitary measures.

Private packing houses represent two-thirds of the total number and supply up to 60 percent-80 percent of vegetables exported from the Agadir area. They are supplied mainly by large farms and companies that well prepared for implementing new rules and measures.

Cooperatives and state-owned packing houses provide approximately 40 percent of the exports and are open to small- and medium-sized farms. They provide services for packaging, labeling, and transport and even the purchase of pesticides and fertilizers. They may also provide financial assistance for small farmers if needed. Packing houses are supplied by either their own members or nonaffiliated farmers.

*Export groups.* Ten groups are specialized in vegetable and tomatoes trade. Tomato trade has become a complicated issue and tends to be dominated by large integrated companies. In 2001, 37 percent of the total tomato exports was supplied by a single exporter that owned different companies.

## **Citrus**

### **Production and Trade**

*Production.* The citrus export story in Morocco began in the 1930s with French agricultural colonization looking for complementarities between colonies' production and French production. In the mid-1970s, large-scale and private irrigation development in Morocco led to an expansion of citrus farming. At present, 95 percent of citrus plantations is located in the major irrigated areas and has an average annual yield of 1,300,000 MT.<sup>10</sup> The acreage for citrus production has remained stable at approximately 75,000 ha due to the limited possibilities of expansion in the irrigated areas.

To foster growth, industry efforts are focused on adapting to market changes in variety preferences. The demand for the traditional "heavy" winter orange varieties such as "Navel" was declining, due to convenience reasons, and competition from the other "winter season" fruits. The producers then tried to reconvert old orange varieties plantations to new "small fruits" (clementines) and late varieties (Maroc Late) plantations. However, to maintain adequate growth of citrus production, the rate of replanting is below what was originally planned.<sup>11</sup> This replanting rate implies that future production may not even be sufficient to satisfy local demand.

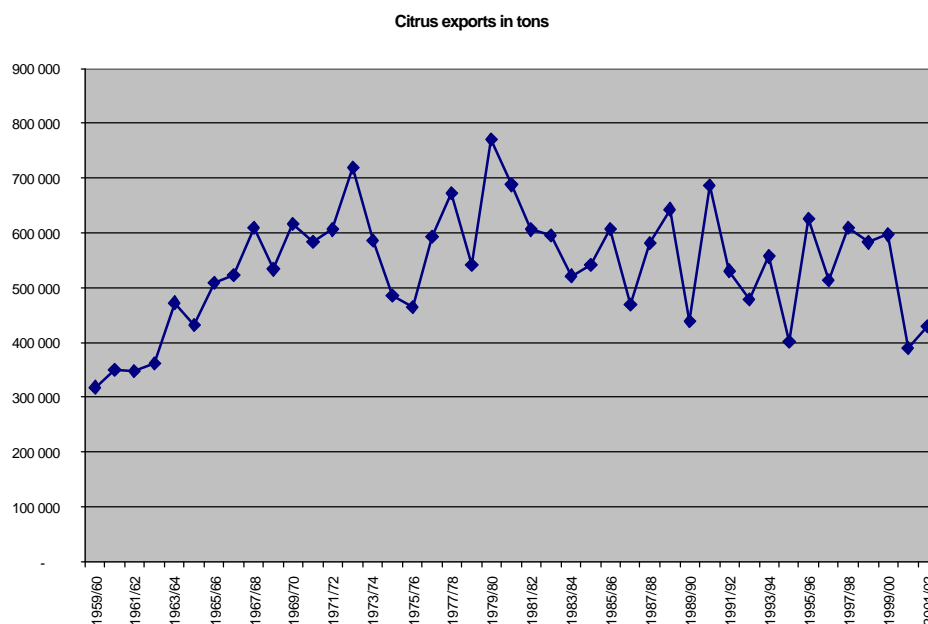
Entry costs are high due to the initial plantation investment. The traditional competitiveness factors have been the seasonality of production and labor intensity. Nowadays, with the globalization of competition, these factors seem less critical. The logistical network and the marketing know-how accumulated during past years are now the critical elements and form a threshold for new entrants.

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<sup>10</sup> Ababouch and Messaho 2002.

<sup>11</sup> USDA-FAS 2004.

**Figure 5. Citrus exports (t)**



Source: Trade statistics, Office des Changes.

*Trade.* Citrus trade is global. Worldwide supply is estimated at 70 million–80 million tons. Of this supply, 8 million–10 millions tons are fresh citrus. Morocco is the third largest exporter after Spain (3 million tons) and the US (1 million tons). The Moroccan position is followed closely by Egypt, Greece, South Africa, and Turkey. Mediterranean countries have dominated this market in the past, but newcomers from Africa, the Americas (Brazil and Cuba), and Asia (primarily China) are rapidly increasing their supply.

The global demand for winter oranges is not growing. The dynamic segments are the new varieties of clementines and mandarins (easy peelers) and off-season oranges.

In Morocco, citrus varieties are produced all year round and can be exported to several foreign markets at any time during the year. Although production has risen considerably over the last several years,<sup>12</sup> the volume of Moroccan exports has been stable for some time at approximately 500,000–600,000 tons (figure 5). This lack of growth is due to increased competition from the other supplier countries and the new safety regulations by the EU markets.<sup>13</sup> This apparent stability also hides an in-depth reconversion effort to adapt the products to changes in market demand and consumer preferences. Product composition has shifted to mandarins and clementines, which are more than 40 percent of the current export volume. These products hold a significant share of the European market—mandarins (39 percent) and oranges (23 percent).

The institution of the single European market and the integration of Spain into the common market in 1986 resulted in the decline of Morocco’s share in the citrus market. Export volumes to the EU went down by almost 50 percent compared to the export levels two decades ago due to the seasonal reference pricing and countervailing tariffs imposed, purportedly, to protect the Spanish citrus industry.<sup>14</sup>

At present, Moroccan citrus markets are not limited exclusively to the EU. Market diversification has been a profitable strategy that explains why the traditional quotas are not fulfilled. Moroccan citrus

<sup>12</sup> Ababouch and Messaho 2002.

<sup>13</sup> Ababouch and Messaho 2002.

<sup>14</sup> Humpal and Jacques 2003a.

products have a good reputation in the world market, which can be divided into high premium markets for clementines in Canada, Japan, and Scandinavia, and commodities markets for oranges in Eastern Europe.

There are factors, however, that may adversely affect long-term prospects for citrus exports.<sup>15</sup> The growth in production lags behind the increasing local and foreign demand. Domestic prices are increasing, prompting the farmers to sell to the local market instead of exporting. Last, the decline in Morocco's share in the EU market may be due to the failure and the difficulty to comply with the safety standards and requirements.

### **Supply Chain**

*Producers.* By Moroccan standards, citrus producers are, in general, large size farms. The total number of producers is approximately 11,000 on a total of 70,000 ha. Modern groves are located mainly in the Agadir area. According to several analysts, the main production concern is water—its consumption and the manner of irrigation. More than 80 percent of the citrus growers still use furrow irrigation, which wastes considerable water.

*Packing houses.* Packing houses are supplied either by their own members or by nonaffiliated farmers. In the case of citrus, 40 percent–60 percent of the supply (Belcadi 2002, Elissigui 1997) are from nonaffiliated farmers. Farmers' affiliations to cooperatives is a complicated issue and constitutes a source of many disputes particularly when it comes to phytosanitary and quality standards issues. Some managers claim that a high percentage of the export rejections comes from nonaffiliated farmers.

Another concern is the limited quantities of produce, resulting in the low efficiency of the packing houses and the high packing and handling costs.<sup>16</sup> The packing houses in the Berkane area handle only clementines and run for only three months (October to January). The Souss packing houses deal with all kinds of citrus produce and run for nine months (October to June).

*Export groups.* There are, at present, 11 export groups that trade actively and principally in citrus.

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<sup>15</sup> USDA-FAS 2004.

<sup>16</sup> Ababouch and Messaho 2002.

### **3. SPS and Food Safety: Issues, Costs, and Strategies**

This chapter contains an analysis of the SPS issues, including costs and exporters' strategies, for fresh produce exports, especially the citrus and tomatoes subsectors. The chapter begins with a summary of Moroccan regulations in sanitary and phytosanitary issues and their enforcement. It is followed by a discussion on the various food safety and quality control systems for citrus and tomatoes currently implemented by Moroccan exporters. The presentation of the authors' estimation of the costs of compliance with the EUREPGAP standard follows. The last section discusses the views of farmers and exporters on costs and benefits.

Markets are divided into high-level SPS and market standards (Canada and Scandinavia), medium-level market standards (EU), and low-level market standards (Eastern Europe and Middle East).

Growing concerns about consumer protection and global competitiveness, which are both closely linked to food quality and safety, resulted in an expanding number of standards and regulations by manifold organizations. In line with the globalization of food markets, different levels of standards must be observed, either mandatory or voluntary. Four levels of standard setting organizations can be distinguished:

1. Supranational standard setting organizations
2. Multilateral standard setting organizations (trading blocs such as the EU)
3. National standard setting organizations
4. Private industry and trade (associations or individual companies).

Mandatory and voluntary standards have become increasingly interlinked. Nowadays, standards set or ruled by supranational bodies have an increasing impact on standardization policies at the other levels:

Standards set by the Codex Alimentarius Commission (CAC) of the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO), the International Plant Protection Convention (IPPC), and the Office Internationale des Epizooties (OIE) are recognized by the World Trade Organization (WTO), which by itself is not a standard-setting organization. Members of the WTO should adapt their standardization policies at multilateral and national levels according to these references, although they may do differently provided they can show scientific reasons. Although voluntary, standards set by the International Organization for Standardization (ISO) have become an integral part of an increasing number of standards at all levels.

Voluntary standards set by foreign buyers have increasingly become de facto requirements for producers, processors, and distributors as their importance for competitiveness in international markets has significantly increased over time. Hence, the distinction between different standard-setting levels becomes volatile and the distinction between mandatory and voluntary standards irrelevant in practice.

#### **SPS Regulation and Enforcement in Morocco**

##### **Historical Background and New Challenges**

In the Moroccan context, some particularities are important to remember so far as SPS compliance is concerned. First, the export sector has a long tradition of technical regulation. Since the early 1940s, a technical approval after inspection has been a precondition for exporters of fresh products. Second, during the first 30 years after Independence (1956–86), export of food products was under a public monopoly (Office de Commercialisation des Exportations, or OCE). As a public institution, OCE trained farmers and exporters about quality issues and modern marketing (labeling). Its activities, while not always

efficient, contributed to a general awareness of the importance of quality issues. Third, as a quota regime has been applied to major exports, exporters have progressively promoted “quality” as a way to increase the commercial value of the preferential access quotas.

In general, Moroccan exporters of fresh produce have been familiar with and have been trained about, external conformity through public controls implemented by competent and trained staff. However, these arrangements are no longer appropriate to meet the new demands of external markets. New challenges are related to the greater requirements for private controls by importers. Some companies involved in tomatoes and citrus production and packaging have responded by implementing new control systems. Some have succeeded; others met with difficulties. The public agencies involved are restructuring their activities, and new needs are emerging that are not financed by the public sector.

## **Regulations**

Phytosanitary issues have been the subject of several laws in Morocco since 1920. The current regulations were recently published in a single compendium, “Législation et Réglementation Phytosanitaire au Maroc.” The main topics covered by this regulation are:

- Organization of the public institutions involved in enforcement of phytosanitary measures
- Legal requirements for trade, import, and export of pesticides and their uses in agriculture
- Designation of the national bodies for phytosanitary control at the borders
- Technical and scientific guidance for pest and diseases control
- Role of professional associations on plant pest and weed control.

Although no reference is made to the international references such as FAO/Codex Alimentarius, the Convention on Biological Diversity (CBD) and its Cartagena Protocol on Biosafety, the International Plant Protection Convention (IPPC), and the Office International des Epizooties (OIE), Morocco recognizes all the new sanitary and phytosanitary measures by bodies acknowledged in the WTO agreements. Many of the standards set by these bodies are adopted by Morocco’s private and public institutions. Citrus and tomato exporters are among those who are implementing a variety of measures related to criteria for end products, quarantine treatments (packaging), sampling procedure (labeling), and risk assessment (testing, inspection, certification, approval procedure.).

## **Institutions under the Ministry of Agriculture Involved in Sanitary and Phytosanitary Regulation and Enforcement**

There are three institutions involved in the regulation and enforcement of sanitary and phytosanitary measures:

1. *Direction de la Protection des Végétaux, du Contrôle Technique et de la Répression des Fraudes.* The DPVCTRF is the largest and the highest ranking public body at the Ministry of Agriculture that deals with the issues of plant protection and phytosanitary standards. With regard to quality control and food safety, the DPVCTRF deals mainly with domestic markets and imports. The DPVCTRF is also the official institution in charge of pesticide registration and law enforcement of pesticide import, fabrication, and trade. Recently, a new division with two regional offices (Agadir and Tanger) was created under the umbrella of the DPVCTRF to deal specifically with quality control and food safety at the borders. The DPVCTRF is also the official institution in charge of the preparation of organic regulation, which is underway.
2. *Etablissement Autonome du Contrôle et de Coordination des Exportations.* The EACCE is the official institution in charge of the control of agricultural products intended for exports. It is an autonomous public institution that operates through its main laboratory in Casablanca and two regional laboratories in Agadir and Tanger.

3. The *Division of Animal Husbandry at the Ministry of Agriculture* is dealing only with sanitary and pharmaceutical issues related to animal products and food. It operates through a network of seven regional laboratories.

The EACCE is the main public institution mandated to assist citrus and vegetable producers to meet their clients' requirements in terms of food quality and biosafety standards. From a technical point of view, EACCE's laboratories are well equipped to run pesticide residues analyses for more than 70 active ingredients through a random sampling system at the packing house level. Sampling is not performed at the farm level. The results of these analyses are made available within 24–48 hours. In the Agadir region, which is the main area for export-oriented citrus and vegetables, the EACCE regional laboratory has, for instance, performed a total of 1,400 analyses in 2002 (50 percent for citrus and 50 percent for vegetables). Farmers benefit from the service with no direct costs. However, they cannot ask for additional or specific analysis, if needed, even at their own expense. Under its current status, the EACCE is not allowed to offer paid services of any kind.

National laboratories, however, have some difficulty in dealing with pesticide analysis for all active ingredients (pesticide molecules). Every year, new pesticides are being introduced by farmers, and the analysis of these pesticides is not always possible for technical reasons.

In Morocco, there is a political debate going on about the necessity of unifying, in a single agency, all the bodies concerned with food safety. This debate has shown that there is room for improving the different functions needed in a food safety policy through a better definition and separation of responsibilities—policy preparation, design of regulations, control and inspection, and research. More coordination is needed among the institutions involved in safety issues at the national level.

## **Food Safety and Quality Control Systems for Citrus and Tomatoes**

### **Compliance in the Supply Chain**

In theory, the decision to comply with SPS measures and implement a given certification standard may be taken at any of the three levels: farms, packing houses or exporter groups (figure 1). However, in most cases, for financial, commercial, technical, and logistical reasons, the packing house is the main and the first level where the decision to implement any kind of standards is taken. This constitutes a driving force for the lower (farmers) and higher (exporter groups) levels of the organizational structure to adopt a similar strategy of quality and biosafety standards.

*Farm level.* Farmers alone, particularly when not affiliated with the cooperative systems, are unlikely to implement any kind of SPS standards, whatever the size of their farms.<sup>17</sup> Those who are affiliated with the cooperative system readily comply with SPS requirements, but only in a collective approach involving all members. At the opposite end, farmers, who are at the same time members and owners of the packing houses, do not hesitate to adopt, even individually, whatever quality systems are necessary. These farmers actually are the leaders of the certification movement that is taking place in several horticultural areas in Morocco.

*Role of the packing houses.* The packing house is the key point in the supply chain for preparation for export. It is the focal point for inspectors, certification bodies, and auditors for all kinds of sanitary and phytosanitary measures because there are few risks for contaminations to occur after this locus in the supply chain. The packing house is, therefore, the first level at which the decision to implement sanitary and phytosanitary measures is taken (or imposed).

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<sup>17</sup> Approximately 70% of the farmers who supply the packing houses are illiterate (Elissigui 1997).

*Role of the export groups.* Regarding biosafety and food quality issues, the export groups have, in general, no direct impact on decisionmaking process, but if for commercial and/or economic reasons, the group decides to change the final destination of the products or enter new markets, their suppliers (private packing houses and cooperatives) must comply with the new standards; otherwise, they will not share in the benefits that might come from these new markets.

### **Quality Control Standards for Citrus and Tomatoes**

Moroccan exporters have been familiar with quality issues for many years. The effort to meet the requirements of the foreign markets is a routine process for the majority of farmers. However, the concept of quality had been limited to the visual and commercial criteria (size, color, weight). Recently, sanitary and phytosanitary requirements in foreign markets have been recognized and progressively integrated in the quality control systems.

Table 4 presents the main standards implemented for fresh agricultural exports from the Agadir region. Six Quality Control Standards (QCSs) are implemented either at the farm and/or packing house levels for citrus and vegetables. These standards differ with regard to the institutions that impose/require them, level in the supply chain at which they are implemented, and certification-auditing process.

With regard to the institutions imposing or requiring these standards, the 6 systems can be classified in 3 categories: (1) worldwide known standards (HACCP and ISO 9001), (2) private EU standards (organic and biodynamic standards), and (3) standards of individual European retailers (EUREPGAP, BRC, Nature's Choice).

The certification bodies for all these standards are from Belgium, Britain, France, and the Netherlands. There is no national certification body yet operating in Morocco. Consequently, Moroccan farmers and exporters are paying the same high price for certification as their counterparts in Europe. For auditing and technical assistance, 2 national consulting companies have emerged in the last 3 years and are operating in the Agadir region. These companies collaborate with foreign consulting companies on the issues of certification and auditing.

**Table 4. Main quality control standards in the citrus and tomato sectors**

<i>Standards</i>	<i>Status of certification</i>	<i>Site of implementation in the supply chain</i>	<i>Reference and/or providers</i>
HACCP	Not certified	Packing houses	Endorsed by CODEX Alimentarius
ISO 9001 & 9014	Certified	Packing houses	IOC
EUREPGAP	Certified	Farm	Retailers
Organic and Biodynamic	Certified	Farm and packing houses	European Union and IFOAM
BRC	Certified	Packing houses	British Retail Consortium
Nature's Choice	Certified	Farms	Retailers

*Source:* Authors.

*HACCP standard.* The HACCP standard is implemented by private as well as public and semi-public institutions. Many private packing houses have implemented HACCP measures in their management strategies. However, the experience with the private sector in this area is at its early stages, and, when asked about it, the managers were not able to make a solid statement about the benefit and/or problems that arise from implementing these measures. The cost of compliance with this process standard includes training, technical and scientific assistance, purchase of new equipment and materials, and monitoring.

*ISO 9001 standards.* Several citrus and vegetable packing houses in the Agadir area are certified for ISO 9001, and some are also preparing for ISO 9014. The whole system of data collection and analysis, as outlined in the ISO 9001 guidelines, is computerized and well integrated in the general management strategy of citrus and tomato packing houses. The experience of farmers and packing house managers with ISO 9001 is generally positive. Compared to the situation before being certified for ISO 9001, many managers recognized significant improvement in the following areas:

- ❑ Competence level of the labor. The implementation of ISO 9001 obliged the owners to hire highly educated people to perform the activities and operations that are needed for record-keeping and permanent risk assessment.
- ❑ Better monitoring of the quality and efficiency of the workers.
- ❑ More rational allocation of time to critical operations in the chain of packaging and conditioning.
- ❑ Significant reduction in the percentage of rejections occurring from mishandling the products along the chain.
- ❑ Positive impact on social issues. Workers with health problems (vision, hearing) were identified and directed to medical treatments.

With regard to the SPS issues, the implementation of ISO 9001 has helped managers at the packing house level to identify and trace back the origin of contaminants and abnormalities that cause export rejections. Knowing that several cooperatives and packing houses are supplied by nonaffiliated members, as mentioned above, the traceability system adopted in ISO 9001 has enabled the identification of the geographical zones and/or farms with higher risks of contamination or low-grade products. As a consequence, the latter have improved their control systems for quality and food safety.

*EUREPGAP standard (or GAP standards).* This private standard is relatively new to citrus and tomato producers in Morocco. It is defined as the framework for Good Agricultural Practices (GAP) on farms. The EUREPGAP standard is, so far, not mandatory, but many farmers see it as a necessary step to maintain access to the European markets in the future. Some European retailers are already requiring a EUREPGAP certificate as a pre-condition for accepting Moroccan products.

The GAP general regulations are divided into Major must, Minor must and recommendations. The control points and compliance criteria standards cover several SPS issues from planting to harvest. In addition to traceability, record-keeping, and worker health, EUREPGAP standards cover a wide range of technical and agronomic issues related to varieties and rootstocks, site history and site management, soil and substrate management, fertilizer use, irrigation, crop protection, harvesting, post-harvest treatment, waste and pollution management, and environmental issues.

Compliance with EUREPGAP standards poses several technical and financial problems for Moroccan producers and exporters. The financial requirements are seen as the main limiting factor for implementation. This is particularly the case for owners of small and medium-sized farms, who are able to pay the cost of certification (approximately \$1200), but cannot afford the additional costs of the investment in equipment and infrastructure needed for compliance with traceability, record-keeping, waste and pollution management, worker health, and environmental issues. For these reasons, EUREPGAP is now implemented only in large farms that have more than 400 ha of citrus and more than 100 ha of vegetables and tomatoes.

*BRC standard.* The British Retail Consortium (BRC) standard was developed by UK supermarket retailers to assist them in fulfilling their legal obligations and protection of the consumer. The BRC standard is recognized by the majority of UK supermarkets. For Moroccan exporters it has become a pre-condition to supply the British retailers who are members of the consortium. The advantage for the BRC

standard is that it could reduce the number of food safety audits by each retailer. However, in practice, supermarkets may also insist on their own audits, and this is what some tomato growers in the Agadir area experienced with a number of British retailers, who insisted on compliance with their own standards. Farmers required to comply with multiple standards for the same country are simply confused and forced to pay various additional costs for the same product exported to the same country.

From a technical point of view, the BRC requires the adoption and implementation of HACCP standards; a documented and effective quality management system; and a control of factory environment standards, product, process, and personnel. These measures are perceived by many farmers as difficult to comply with and requiring several months (or years) of preparation. At present, there is only one packing house in the Agadir area that has a BRC certificate, others are preparing for it.

The following are some of the difficulties and salient criticisms reported by the manager of the only BRC-certified packing house about his experience with the implementation of this standard:

- ❑ Under the BRC system, auditing is performed annually and whenever there is a need to improve the quality control process. This leads to additional and unpredictable costs.
- ❑ Considerable amounts of money and time have been allocated for R&D to adjust for clothes, sanitary equipments, and upgrading the existing facilities to meet the BRC requirements.
- ❑ The required pesticide residues analysis is a bottleneck. It is not one of the pesticide analyses performed by the EACCE laboratory. The official laboratory (Laboratoire Officiel des Analyses et Recherches de Casablanca, or LOARC) cannot meet the needs of the exporters, either. It has only one facility located in Casablanca to serve the whole country and no regional branches. In addition, due to technical limitations, the analysis of some pesticides as required by the BRC auditors cannot be performed at the national level. Samples then must be sent to Europe, which is time consuming and costly.
- ❑ The technical specifications for the gloves, hats, and clothes in the BRC standard were inappropriate to the climatic conditions in the south of Morocco. The items were uncomfortable and too hot, and therefore rejected by the workers, who refused to wear the clothes.
- ❑ BRC auditors are not aware of the above limitations and, therefore, ignore the Moroccan reality while auditing the compliance of their clients to the standards.
- ❑ The BRC standard gives no guidelines on sampling for residues analysis, and applied research is badly needed by the packing house managers.

Compliance with BRC sanitary measures is incurring more additional costs than any other standard. A precise estimation of these costs is very difficult at this stage because reliable data are still lacking. However, in general, additional direct costs are necessary for the building and infrastructure, equipment and safety tools, technical assistance, training, research and development, and residue analysis.

*Organic (and biodynamic) standards.* Organic standards for production, packaging and labeling have been implemented for citrus and vegetables since 1994 in Morocco. Some farmers are also implementing the Demeter standard for biodynamic production.

The export of organic citrus and vegetables reached 5,000 MT in 2001 but decreased to 3,800 MT in 2003. According to farmers who have been operating in the sector since 1994, one of the main reasons behind this decrease is the lack of national regulation and support. In fact, compliance with organic standards is confronted with a number of difficulties, but the more salient points with regard to costs and exports are:

- ❑ In the absence of a national regulation (which is under preparation), Moroccan farmers are implementing EU regulation, EU 2092/91. As a result, auditing and certification are performed by foreign certification bodies using the European criteria for cost calculation.
- ❑ Organic standards must be applied on farms as well as in the packing houses, which means, basically, a higher price for auditing compared to the other standards.
- ❑ The cost of certification is high and is the main limiting factor.
- ❑ The lack of subsidy, at least during the conversion period, does not encourage farmers to implement the organic standard.
- ❑ The lack of technical assistance and science-based standards adapted to local climatic conditions costs Moroccan farmers much more than their European counterparts. For instance, EU regulation limits the use of nitrogen to 170 kg/ha, a level that is not convenient for vegetable production under arid and semi-arid climatic conditions.
- ❑ The lack of transparency of the organic market channels and the difficulty to get access into these market niches are discouraging and undermine the effect of the implementation of the organic standard.

Given the environmentally friendly character of the organic production systems, many farmers believe that the government should make a special contribution to the organic sector and share some of the costs incurred by the compliance with the strict organic standards.

*Nature's Choice standard.* This is the latest standard imposed by private UK retailers to some citrus and tomato producers. The label "Nature's Choice" is meant to satisfy a fraction of British consumers who are concerned about environmental issues. Three exporters, among those interviewed in this study, are preparing for it.

### **Farmers' Point s of View Regarding Pesticide Residue Issues**

From a technical point of view, a number of issues related to pesticide availability, registration, and application are hampering the efforts of farmers to comply with the above standards (primarily, EUREPGAP and BRC). Many of these constraints are incurring additional costs (direct and indirect). The salient issues outlined by the farmers interviewed for this study are:

- ❑ *Preharvest Interval requirement.* The Preharvest Interval (PI) is the minimum waiting period before picking fruits and vegetables after pesticide application. Many farmers expressed concern about the high restriction imposed with the use of some pesticides. Compared to the situation in the neighboring countries (France and Spain), the PI of some pesticides is 3 to 7 times higher in Morocco. For instance, Vertimec, a known pesticide used against nematode, has a PI of 21 days in Morocco and only 3 days in France. Such restriction is seen by many Moroccan farmers as discriminatory.
- ❑ *Preharvest Interval for sensitive crops.* The Preharvest Interval varies, in general, from 1 to 30 days, but for several pesticides it does not exceed 3 days. Even this is considered by farmers as a serious limit that is sometimes difficult or even impossible; particularly with crops that must be harvested daily, such as beans and zucchini. For these kinds of crops, farmers must apply pesticides every day or every two days during the harvesting stage to control pathogen dissemination. This practice, however, increases the risk of pesticide accumulation in the fruit. Given this technical difficulty in complying with the PI issues, some farmers prefer not to grow sensitive crops such as beans and zucchini. Consequently, they are prevented from entering some of the most promising export markets (for example, the UK market for bean).

Fortunately, there is no such risk for crops that are harvested twice or three times per week, which include tomato, melon, and pepper, thus making the management of PI issues easier even during the harvesting period.

- ❑ *Compliance with pesticide use in the country of destination.* No pesticides can be used that are not registered in the country of destination. Therefore, farmers must use a similar pesticide that is available in the country in which the final product will be sold, but this is not always possible because the final destination is usually not known before (or close to) harvest. In other cases, the country of the final destination may change for commercial and/or logistical reasons, which can result in compliance problems.
- ❑ *Pesticide registration.* The national system for pesticide registration is seen by many farmers as inappropriate, slow, and not well adapted to export-oriented crops. Many farmers choose their pesticides among those registered in France and Spain even though they are not yet officially registered in Morocco; in such cases, they find themselves in an uncomfortable position with regard to the national regulation.
- ❑ *Pesticide availability.* For many pests and diseases, few pesticides with adequate PI are available on the national market, while in Europe, farmers have access to a wide range of pesticides. The lack of appropriate pesticides for a given pest or disease may be fatal to the marketing at some point in the supply chain.
- ❑ *MRLs (Maximum Residue Limits) issues.* Moroccan farmers must comply with the MRLs of several countries, which may vary from year to year.
- ❑ *Equivalence.* Pesticides that are registered in Morocco may not be allowed in other countries.
- ❑ *National restrictions.* Some pesticides are allowed in Europe but not in the US and vice-versa.

### Costs of Multiple Standards

The above discussion has highlighted the main elements of the technical standards and conformity assessment procedures with which Moroccan exporters of citrus and vegetables must comply in each market. The complexity of managing multiple standards is critical for exporters dealing with a large spectrum of markets.

The impact of technical standards on the exports of citrus and vegetables is exacerbated by the fact that exporters are required to comply simultaneously with the requirements of at least 3 standards (see examples in table 5). Some of the standards are specific to the packing houses (BRC); others are specific for growers (GAP, Nature’s Choice). BRC for packing houses includes a HACCP requirement. Farmers thus are obliged to comply with at least two standards: one at the packing house level and another one at the farm level. Additional standards may be imposed by specific retailers, as in the case of Nature’s Choice and organic standards.

**Table 5. Examples of compliance with multiple standards for citrus and vegetable**

<i>Company code</i>	<i>Crops</i>	<i>Standards implemented</i>
Company A (Maraiassa)	Vegetables	EUREPGAP, BRC, HACCP, National standards
Company B (Copag)	Vegetables, citrus	ISO9001, HACCP, EUREPGAP (under preparation)
Company C (Kabbaj)	Vegetables, citrus	ISO9001 (90014 under preparation), HACCP, EUREPGAP, Nature’s Choice (under preparation)
Company D (Delassus)	Citrus	ISO9001, HACCP, EUREPGAP, Nature’s Choice (under preparation)
Company E (Rosafior)	Vegetables	ISO9001, EUREPGAP, BRC, HACCP

*Source:* Authors from interviews.

*Compatibility of standards.* There are clear differences in the sanitary and other technical standards among the main QCS implemented in the export sector of fruits and vegetables in Morocco. Farmers have been trying to overcome the constraints imposed by these differences, but in the absence of any equivalence agreements among the various certifying and regulatory bodies, the task of complying with all the measures will remain a serious handicap to the export of citrus and vegetables. Many farmers and packing house managers interviewed in this study did, indeed, indicate that differences in standards are, by far, the most serious problem of all.

*Compositional standards.* The critical issue in phytosanitary measures are related to PI and MRL. There are many differences in compositional standards for comparable pesticides between Morocco and the neighboring Mediterranean countries such as France and Spain. Differences in technical standards between markets can reduce the scope for economies of scale, especially, for smaller cooperatives and packing houses.

*Obtaining information about and keeping track of certification standards.* Significant costs are incurred when a noncertified farmer gathers information about the requirements for any one of the certification systems, or when a certified farmer needs to monitor changes in existing standards overtime. For instance, EUREPGAP standards have been amended two times since the first edition in 2001.

*Equivalence of standards.* There is no equivalence between the different standards currently implemented in citrus and vegetable exports. For example, the EUREPGAP certificate is not enough for British retailers implementing Nature's Choice standards. Similarly, a farmer who is certified organic cannot be exempted from the EUREPGAP requirement, even though organic standards are more restrictive than EUREPGAP with regard to pesticide and fertilizers usage. Many farmers have, therefore, expressed *the need for equivalence and/or harmonization of sanitary and phytosanitary standards* if exports of fresh citrus and vegetables to OECD countries are to be promoted.

*Customer-specific requirements.* Some tomato exporters interviewed for this study have been more concerned about the standards laid down by their customers than by any legal or international and/or science-based standards. Some of these specific client requirements are stricter than the requirements for certifications schemes. Furthermore, in these cases, import and marketing procedures in the destination country are handled by the importer; therefore, exporters have limited or no access to other potential markets. This is the case for the farmers who are preparing for the Nature's Choice standards.

*Essential and optional requirements.* For private standards, some farmers reported a lack of a clear distinction between essential safety regulations and optional requirements for waste management. An example is the case of recycling plastic, which needs high-end technologies that are not available in the country. The lack of distinction is allegedly due, in part, to the role of the private organizations that provide assessment and certification measures.

## **Cost of Compliance with SPS and Quality Standards**

The farmers interviewed in this study who are already implementing SPS requirements agreed that the additional costs incurred by compliance can be subdivided into 7 basic elements:

1. *Buildings and facilities* that must be constructed to store chemicals, pesticides, and fertilizers
2. *Equipment* with specific technical requirements to apply fertilizers and pesticides
3. *Technical assistance* before and during the implementation of the standards
4. *Training* for three categories of personnel: managers, technicians, and workers
5. *Monitoring and surveillance*

6. *Current input use*
7. *Certification.*

Other costs related to salaries, paper work, communication, research, and administration also are incurred but are difficult to quantify. The degree of importance of these elements for the 5 main standards implemented in citrus and vegetables export is presented in table 6.

**Table 6. Importance of elements in the different quality control standards**

	<i>ISO</i>	<i>HACCP</i>	<i>BRC</i>	<i>EUREPGAP</i>	<i>Organic</i>
Buildings	-	-	+++	++	-
Equipment	+	++	+++	+++	-
Technical assistance	+++	+++	+++	+++	+++
Training	++	+++	+++	+++	++
Monitoring and surveillance	++	+++	+++	+++	+
Current input use	-	++	+++	+++	+++
Certification	++	-	+++	++	+++

*Source:* Authors based on interviews.

*Note:* Degree of importance is indicated as follows: +++ = high; ++ = medium; + = low; - = not considered.

### **Cost of Compliance with the EUREPGAP Standard**

The authors selected a case study approach because it is possible neither to cover all applicable standards for the entire product ranges of interest within this one study nor to supply the entire documentation on relevant legislation and codes, due to the complexity of both mandatory legal provisions and voluntary codes of practice.

A micro-analytical approach was adopted for the following specific case: the data concerning the cost of the main elements for implementing the EUREPGAP standard were collected for a medium-sized farm with these characteristics:

- ❑ Total area: 10 ha of tomato grown under plastic greenhouses
- ❑ Objective: winter production totally oriented to export
- ❑ Workers: 10 permanent and 50 temporary
- ❑ Yield : 250 tons per ha
- ❑ Status: private (The farm belongs to one of the largest vegetable production companies in Morocco).

The EUREPGAP standard was chosen to calculate the cost of compliance for the following reasons:

- ❑ It is the main new standard currently applied at the farm level in Morocco in general, and in the Souss Massa valley in particular.
- ❑ Many farmers are preparing for its implementation within the next three years.
- ❑ It is the only technical standard for which data are now available.
- ❑ It is a quite complicated standard that embraces a wide variety of issues (sanitary, environmental, and phytosanitary).

Details of the costs incurred with the compliance with the EUREPGAP standard in this farm are presented in table 7 (MAD, national currency) and table 8 (US\$)

**Table 7. Cost of compliance with the EUREPGAP standard (tomato farm) (MAD)**

<i>Items</i>	<i>Units</i>	<i>Cost for 10 ha (MAD)</i>	<i>Cost/ha/year (MAD)</i>
1. Buildings and facilities			
• Storage room for pesticides <sup>a</sup>	1	62,500	
• Storage room for fertilizers	1	62,500	
• Pesticides station	1	60,000	
• Fertigation station	1	60,000	
• Toilet facilities	3 x 1500	4,500	
• Changing room for workers	1	30,000	
• Offices	1	30,000	
Subtotal		309,500	1,548
2. Equipment			
2.1. For pesticide delivery <sup>b</sup>			
• Tanks (5 MT)	1	6,000	
• Pump	1	30,000	
• Engine	1	30,000	
• High pressure channel	1	24,500	
• Low pressure channel	1	12,000	
• Plastic vans	40 x 50 dh	2,000	
		50,000	
2.2. Equipment for fertigation <sup>c</sup>			
Subtotal		154,500	3,090
3. Technical assistance	12 mo x 4000 dh	48,000	4,800
4. Training	3 x 4000 dh	12,000	1,200
5. Monitoring and surveillance	12 x 7000 dh	84,000	8,400
6. Current input use			
• Sanitary equipments for workers (masks, clothes, gloves, glasses, shoes)	12 x 1000 dh	12,000	
• Warning panels	20 x 20 dh	400	
• Fire extinguishers	2 x 600 dh	1,200	
Subtotal		13,600	1,360
7. Cost of certification <sup>d</sup>			
• Initial auditing	1 audit	12,000	
• Paper work and implementation		4,000	
• Annual auditing		10,000	
Subtotal		26,000	2,600
Grand total		647,600	22,998

Source: Authors' calculations.

Notes:

a Depreciation period = 20 yrs.

b Depreciation period = 5 yrs.

c Fertigation is a new technology wherein drip irrigation systems are used to deliver nutrients to crops in a soluble forms.

d Cost of certification and auditing depend on the certification body, but, in general, national auditors charge 50% less than foreign auditors.

According to the authors' estimates, it costs approximately US\$71,087 in the first year to implement the EUREPGAP standard on a 10-ha tomato farm. The main costs (US\$50,933) are for the buildings and the new equipment that farmers must purchase in preparation to implement the standard. These two elements comprise approximately 72 percent of the total cost and represent the nonrecurring costs: one-time expenditures to set up the implementation. The other 28 percent (US\$20,154) are the recurring costs of compliance (technical assistance, training, monitoring and surveillance, current input use and

certification). Calculated on an annual basis with depreciation and excluding interest, the costs total US\$2,524/ha.

**Table 8. Cost of compliance with the EUREPGAP standard (tomato farm) (US\$)**

<i>Items</i>	<i>Cost for 10 ha</i>		<i>Cost/ha/year</i>	
	<i>US\$</i>	<i>% of total</i>	<i>US\$</i>	<i>% of total</i>
1. Building and facilities	\$33,974	47.8	\$170	6.8
2. Equipment	16,959	23.9	339	13.4
3. Technical assistance	5,269	7.4	527	20.9
4. Training	1,317	1.8	132	5.2
5. Monitoring and surveillance	9,221	13.0	922	36.5
6. Consumables	1,493	2.1	149	5.9
7. Certification costs	2,854	4.0	285	11.3
<b>Total</b>	<b>\$71,087</b>	<b>100.0</b>	<b>\$2,524</b>	<b>100.0</b>

*Source:* Authors' calculations.

*Note:* From table 7, used US\$1 = 9.11 MAD.

Because companies and large farms are able to afford these charges, they can purchase all of the required equipment and facilities within six or seven months (a maximum of one year). Small- and medium-sized farms cannot afford to pay for these costs all at once, so they tend to prepare for the requirement in two or three years. For vegetables other than tomatoes, compliance with the EUREPGAP standard is likely to incur similar costs. However, for citrus, some adjustments should be considered, such as the mobility of sanitation and hygiene facilities, which would increase the costs.

Table 9 presents the share of the compliance cost in the total production costs. The costs of production in table 9 do not include post-harvest activities such as transport and packaging. With a yield of 250 T/ha, of which only 70 percent is exportable and 30 percent is sold on the local market, average farm gate cost in this case is 1.25 MAD/kg, which is half the average cost in the industry (approximately 2.5 MAD/kg). Total post-harvest costs are estimated at 2.2 MAD/kg, and transport and marketing costs at 3.2 MAD/kg. Farm gate price, on the average, is not higher than 3 MAD/kg, varying between 2–5 MAD/kg.

**Table 9. Share of the EUREPGAP compliance cost to production costs per ha**

<i>Items</i>	<i>Value (MAD)</i>	<i>%</i>
Fixed charges <sup>1</sup>	119,166	40
Labor <sup>1</sup>	43,846	15
Consumables (fertilizers, water, pesticides) <sup>1</sup>	101,347	34
Other charges <sup>1</sup>	9,719	3
Cost of compliance with EUREPGAP <sup>2</sup>	22,998	8
<b>Total</b>	<b>297,076</b>	<b>100</b>

<sup>1</sup>Elements 1–4 are from Belcadi 2002.

<sup>2</sup>From table 7.

The study shows that the cost of compliance with the EUREPGAP standard for a highly efficient producer is 8 percent of the total farm gate cost (table 9). This share will probably double for an average farmer. However, because farm costs represent only approximately one-third of the total costs (which include post-harvest, transport, and marketing), compliance costs represent only 3 percent of the total cost for an integrated efficient exporter. Similar figures should be considered for the main vegetable commodities grown under similar farming systems as tomato. This estimate should be taken as a general figure since the sample is small and many other indirect costs are not included.

The total cost of compliance may be higher in the case of compliance with multiple standards (BRC + EUREPGAP).

## **Costs and Benefits Issues in Farmers' and Exporters' Opinions**

Technical standards and conformity assessments are perceived by the majority of the farmers and exporters as major barriers to export. Some considered them as “nuisances” or “necessary evils,” as described by one farmer.

The consensus among the farmers and exporters interviewed is that the main and only benefit in complying with these standards is access to overseas markets. On the other hand, many did recognize that implementing QCS does significantly improve the management at the packing houses, quality of the end product, and efficiency of employees.

Differences in technical requirements and/or conformity assessment procedures make the process of compliance very difficult, at least for small and medium-income farmers, who represent more than 40 percent of the suppliers in the export chain for citrus and vegetables.

These differences greatly influence the capability to export citrus and vegetables. Some farmers indicate that in the future they may be prevented from exporting certain products to certain destinations due to the costs of compliance with technical requirements. These costs very much affect the crops, such as beans and zucchini, that have a narrow Preharvest Interval.

For farmers and exporters, the most important sources of information regarding technical standards and compliance are foreign retailers, certification bodies, and private consultants. Government agencies and public institutions were not mentioned as providers of adequate information on these matters.

### **Other Benefits of Compliance**

Compliance with higher standards for export of tomatoes and citrus has spill-over effects beyond the direct commercial benefits. For example, some 30 percent of the production of tomatoes is sold in domestic markets, and higher safety standards will benefit domestic consumers. Application of management systems for compliance with higher standards, such as ISO 9001, results in better working standards in the workplace and more demand for trained staff. To the extent that meeting higher standards forms a license to export, it creates employment throughout the supply chain.

## 4. Conclusions and Recommendations

### Conclusions

In Morocco, six QCSs implemented at either the farm and/or packing house levels for citrus and vegetables. These standards differ with regard to the institutions that impose/require them; the level in the supply chain at which they are implemented; and the certification-auditing process.

In terms of regulations, the sanitary and phytosanitary measures with which farmers must comply are similar for citrus and tomato. Some problems, however, are more difficult to resolve, for example, the preharvest interval (PI) restrictions on application of pesticides for bean and zucchini.

International standards (ISO, HACCP) are seen as more relevant than private standards and national standards, but they are not enough to get access into European markets. Moroccan farmers interviewed often perceived specific requirements of some retailers and supermarkets as drastic and costly, and sometimes not appropriate to local (social and climatic) conditions.

Technical standards are not harmonized even within countries in trading blocks such as Europe, and many Moroccan exporters are experiencing more difficulties getting their products into the British markets than into the rest of Europe. Information on technical standards and certification process is difficult to come by and to transfer to the farmers, in part because of the high levels of illiteracy. Some environmental issues are impossible to comply with, even for large companies (for instance, recycling plastic).

This case study revealed that the implementation of the EUREPGAP standard increases production cost by 8 percent for an efficient farmer—and probably more for an average farmer. The 8 percent at the farm level equates to approximately 3 percent for the cost of the whole supply chain of an integrated exporter. In the case of compliance with multiple standards (EUREPGAP + BRC), the additional costs will be even higher. Therefore, compliance with standards clearly can benefit large-scale companies over their small-scale competitors.

### Recommendations

The authors' recommendations concern various aspects: harmonization of standards and procedures across importing countries; updating the national regulation in pesticides registration and use; providing assistance toward reducing the cost of compliance, and developing a participatory research program at the national level, perhaps with international cooperation and assistance.

The first and urgent need expressed by many exporters is for importing countries to harmonize the technical standards. The adoption of uniform procedures for certification and auditing will be also welcomed by both producers and exporters.

The second recommendation is for the Moroccan government to update the national regulation for sanitary and phytosanitary issues. Urgent reforms on the issues of pesticides registration and preharvest interval (PI) are badly needed. The National Association for the Producers and Exporters of Fruit and Vegetable (APEFEL) has already initiated a program to update the list of approved pesticides that need to be registered if the requirements of the new standards are to be met.

To reduce the cost of compliance for the industry, private sector involvement in certification, auditing, technical assistance, and pesticide residues analysis is needed.

A solid and rational cooperative research and development program on sanitary and phytosanitary issues involving all the stakeholders—governments, food industry, traders, retailers, and consumers—would be beneficial. In this program, international assistance would be useful in providing education to

Government and private sector staff in the areas of biosafety and SPS in general; adaptability of the technical standards to developing countries' socioeconomic and cultural conditions; and upgrading the agronomic and environmental conditions in small and medium-sized enterprises, which supply 40 percent of the total volume of citrus and tomato exported to Europe and elsewhere.

## Appendix 1. Contacts in the Souss Region

<i>Date</i>	<i>Contact</i>	<i>Activity</i>	<i>Type of contact</i>
24/11/03	APEFEL	Producer organization	Meeting
25/11/03	ROSAFLOR	Packing house	Packer survey
25/11/03	IDYL	Export group	Meeting
01/12/03	PACK SOUSS	Packing house	Packer survey
01/12/03	DELASSUS	Export group	Meeting
02/12/03	Coopérative AL MANAR	Packing house	Packer survey
02/12/03	Monsieur Elouad	Producer AL MANAR	Producer survey
03/12/03	Monsieur Aziz Hra	Producer AL MANAR	Producer survey
03/12/03	Monsieur Jazouli	Producer AL MANAR	Producer survey
04/12/03	GPA	Export group	Meeting
04/12/03	Kabbage Souss	Packing house	Packer survey
05/12/03	Sapiama	Packing house	Packer survey
05/12/03	Monsieur Ikkal Sraïri	Producer Kabbage Souss	Producer survey
06/12/03	Monsieur Moufti	Producer Kabbage Souss	Producer survey
08/12/03	PRIMATLAS	Export group	Meeting
08/12/03	Monsieur Baala	Producer Primatlas	Producer survey
09/12/03	Monsieur Zahidi	Producer–member APEFEL	Producer survey
09/12/03	Monsieur Benabdejlil	Producer–member APEFEL	Producer survey
10/12/03	Monsieur Meziani	Producer–member APEFEL	Producer survey
10/12/03	EL BORA	Packing house	Packer survey
11/12/03	La gazelle	Producer El BORA	Producer survey
11/12/03	MABROUKA	Packing house	Packer survey
12/12/03	COPAG	Packing house	Packer survey
12/12/03	Monsieur Loultiti	Producer COPAG	Producer survey
13/12/03	Monsieur Lkam	Producer COPAG	Producer survey
15/12/03	Monsieur Abdaimi	Producer COPAG	Producer survey
15/12/03	Monsieur Taoufiqui	Producer COPAG	Producer survey
16/12/03	Monsieur Touhami	Producer COPAG	Producer survey
18/12/03	DPVCTRF	Public agency	Meeting
19/12/03	EACCE	Public agency	Meeting

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- <http://www.fao.org> Food and Agriculture Organization of the United Nations (FAO)
- <http://www.ippc.int> International Plant Protection Convention (IPPC)
- <http://www.iso.org> International Organization for Standardization (ISO)
- <http://www.mcinet.gov.ma> (documents and regulations on standardization and certification)
- <http://www.oie.int> International Organization of Epizooties
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