

# *Medi***TERRA**

---

07

INTERNATIONAL CENTRE FOR ADVANCED MEDITERRANEAN AGRONOMIC STUDIES  
PRESSES DE SCIENCES PO

Électre-Bibliographie cataloguing (in conjunction with the Sciences Po Library)

Mediterra 2007. Identity and quality of Mediterranean foodstuffs / edited by Bertrand Hervieu – Paris: Presses de Sciences Po, 2007.

ISBN 978-2-7246-1028-4

RAMEAU:

- ↪ Aliments: Approvisionnement: Méditerranée (région)
- ↪ Risques alimentaires: Méditerranée (région)
- ↪ Produits laitiers: Industrie et commerce: Méditerranée (région)

DEWEY:

- ↪ 338.1: Économie de la production agricole (produits agricoles)
- ↪ 363.3: Protection de l'environnement – Problèmes sanitaires
- ↪ 630: Agriculture – Généralités

The 1957 Intellectual Property Act explicitly prohibits photocopying for collective use without the authorisation of the rightful owner(s). (Only photocopying for the private use of the copier is authorised.) We therefore emphasise that any form of reproduction of the present work, whether in part or in full, is prohibited without the authorisation of the editor or of the Centre français d'exploitation du droit de copie (CFC, 3, rue Hautefeuille, 75006 Paris).

# MediTERRA

IDENTITY AND QUALITY OF  
MEDITERRANEAN FOODSTUFFS

*Edited by Bertrand Hervieu*

07

INTERNATIONAL CENTRE FOR ADVANCED MEDITERRANEAN AGRONOMIC STUDIES  
PRESSES DE SCIENCES PO







CIHEAM

**INTERNATIONAL CENTRE FOR ADVANCED  
MEDITERRANEAN AGRONOMIC STUDIES**

**Chairman: Abdelaziz Mougou**  
**Secretary General: Bertrand Hervieu**

11, rue Newton - 75116 PARIS (FRANCE)  
Tél.: +33 (01) 53 23 91 00 - Fax: +33 (01) 53 23 91 01/02  
e-mail: [secretariat@ciheam.org](mailto:secretariat@ciheam.org)  
<http://www.ciheam.org>

The International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM) was founded on 21 May 1962 on the joint initiative of the OECD and the Council of Europe.

It is an intergovernmental organisation, which now unites thirteen member States in the Mediterranean region (Albania, Algeria, Egypt, Spain, France, Greece, Italy, Lebanon, Malta, Morocco, Portugal, Tunisia and Turkey). The Centre is structured around a general secretariat, located in Paris, and four Institutes of Mediterranean Agronomy (Bari, Chania, Montpellier and Zaragoza).

With its three fundamental missions (training, research and cooperation), which form the core of its work, the CIHEAM has gradually come to be recognised as an authority in its fields of activity: agriculture, food, and rural development in the Mediterranean region.

**IAM**

**MEDITERRANEAN AGRONOMIC INSTITUTES**

**IAM-Bari (ITALY)**

Director: **Cosimo Lacirignola**

Via Ceglie 9  
70010 VALENZANO, Bari, Italy  
Tél.: +39 (080) 4606 111  
Fax: +39 (080) 4606 206  
e-mail: [masciale@iamb.it](mailto:masciale@iamb.it)

**IAM-Chania (GREECE)**

Director: **Alkinoos Nikolaidis**

P.O. Box 85  
73100 CHANIA, Crete, Greece  
Tél.: +30 (2821) 03 50 00  
Fax: +30 (2821) 03 50 01  
e-mail: [alkinoos@maich.gr](mailto:alkinoos@maich.gr)

**IAM-Montpellier (FRANCE)**

Director: **Vincent Dollé**

3191, route de Mende  
34093 MONTPELLIER Cedex 5, France  
Tél.: +33 (04) 6704 6000  
Fax: +33 (04) 67 54 25 27  
e-mail: [sciuto@iamm.fr](mailto:sciuto@iamm.fr)

**IAM-Zaragoza (SPAIN)**

Director: **Luis Esteruelas**

Apartado 202  
50080 ZARAGOZA, Spain  
Tél.: +34 (976) 71 60 00  
Fax: +34 (976) 71 60 01  
e-mail: [iamz@iamz.ciheam.org](mailto:iamz@iamz.ciheam.org)



# Table of CONTENTS

**PREFACE** 15

**CONTRIBUTORS** 17

**ABBREVIATIONS AND ACRONYMS** 19

**INTRODUCTION** 23

**1 THE FOUNDATIONS**  
of food safety 25

**> CHAPTER 1**  
**Risks and food safety in a context**  
**of globalisation**  
towards a political and strategic approach 27

*Jean-Louis Rastoin*

- Food risks and food crises 30
- The precautionary principle and public consumer protection mechanisms 41
- Strategies of food system actors 49
- Conclusion 63
- Appendix 66

**> CHAPTER 2**  
**Quality perception**  
**and consumer behaviour** 69

*Luis Miguel Albisu*

- Food product quality 69
- Intrinsic physico-chemical attributes 71
- Extrinsic attributes 74
- Quality perceptions concerning packaging and presentation 75
- The distribution system and food product quality 77
- Image and food quality perception 80
- Consumer buying decisions 81
- Concluding remarks 85

**> CHAPTER 3****Food safety and market needs 89***Luis Miguel Albisu*

- A major challenge **89**
- Health crises: multiplication and media attention **91**
- Perceived risks **93**
- Food safety decisions **96**
- Traceability **98**
- Genetically modified organisms **100**
- National and international regulations **102**
- Consumer concerns **103**
- International competition, a security asset? **104**

**> CHAPTER 4****Food quality in Europe 109***Ana I. Sanjuan*

- European food quality policy **109**
- Protected Designations of Origin, Geographical Indications and Traditional Specialities **115**
- Geographical indications and the World Trade Organization (WTO) **122**
- Geographical indications and consumers **125**
- Organic Food **127**
- Final considerations **129**
- Appendix **131**

**2 THE QUALITY OF MEDITERRANEAN FOOD PRODUCTS****the case of milk products and milk derivatives 137****> CHAPTER 5****Roquefort an emblematic RDO industry 139***Julien Frayssignes*

- The founding principles of the Designation of Origin: from the local area to the region **139**
- Designations of origin facing international challenges **142**
- The Roquefort RDO in regional development dynamics **150**
- Strengths and weaknesses of a course of development **173**

**> CHAPTER 6****Spanish PDO cheeses  
a still atomised market** **177***Mercedes Sanchez*

- Growth trends in Spanish cheese production and consumption **177**
- Social and economic importance of Spanish PDO cheeses **180**
- Consumer-perceived food quality: the challenges ahead for Spanish PDO cheeses **188**
- Appendix **190**

**> CHAPTER 7****The quality of agro-food products in Tunisia  
developing a strategy** **191***Lokman Zaibet*

- Major changes **191**
- National policy and the legislation in force **191**
- Quality promotion schemes **194**
- Certification and quality marks **197**
- Organic agriculture and designation of origin/indication of source **200**
- Quality and the local market **203**
- Quality perception and behaviour of Tunisian consumers **205**
- Development prospects **206**
- Appendix **208**

**3 QUALITY AND STRATEGY**  
of the milk and milk product industries **211****> CHAPTER 8****The French milk industry  
a major and mature market** **213***Jean-Louis Maubois*

- Position in Europe and the world **213**
- The structure of milk production in France **213**
- Structure of the processing sector **215**
- The structure and development of consumption with the impact of health connotations **221**
- Conclusions **225**

**> CHAPTER 9****Milk and milk products in Italy  
area policies and Europeanisation 227***Daniele Rama*

- Can one speak of an Italian milk policy? 227
- Market size and value chain 230
- Milk production is restructuring 232
- A bipolarised processing industry 234
- Consumption and distribution 240

**> CHAPTER 10****Restructuring of the Spanish milk industry  
quality and corporate strategies 245***Samir Mili*

- Milk production structures and policy 245
- Consumption and distribution of milk  
and milk products 255
- Quality and traceability in the Spanish milk system 259
- Structure of the industry and corporate strategies 267
- Conclusion 276

**> CHAPTER 11****The milk and milk product sector in Morocco 279***Akka Ait El Mekki*

- Overview of milk production policy in Morocco 279
- Consumption trends 281
- Legislation and regulations governing milk  
products and derivatives 286
- Structure of the milk industry 290
- Structure of milk product marketing channels 294
- Conclusions and proposals for action 297

**SECTORAL INDICATORS 299***Mahmoud Allaya & Gabrielle Rucheton*

- Introduction 301
- Populations and population trends 302
- Population growth 304
- Urban population 306
- Rural population 308

• Total working population	310
• Working farm population	312
• Gross domestic product (GDP)	314
• Consumption	316
• Agricultural commodities	318
• Balance of trade	324
• Cropland	326
• Fertilisers, irrigation, yields	328
• Self-sufficiency coefficients	330
• References	332

<b>BIBLIOGRAPHY</b>	339
---------------------	-----

<b>TABLE OF DOCUMENTS</b>	357
---------------------------	-----





## PREFACE

---



The ninth annual report of the International Centre of Advanced Mediterranean Agronomic Studies (CIHEAM), *Mediterra 2007*, is an innovation. Its first edition was entrusted to the Presses de Sciences Po, a publishing house specialised in the publication of works in the political and social sciences and which will also publish the English version. For the fourth year in succession, this report is also being published in Arabic in Cairo, thanks to the diligence of Prof. Mohamed Nawar; it is being published in Spanish in Madrid for the second time and in Italian for the first time, in Bari.

*Mediterra* aims to become the annual reference on agriculture, food and sustainable rural development in the Mediterranean region. It relies on a network of researchers and experts attached to university institutes in the countries bordering the Mediterranean, who elaborate analyses, comparisons and proposals in the course of shared research and training programmes.

Although the contours and definition of the Mediterranean region remain uncertain, there is one attribute which eminently contributes to its delimitation, and that is food, and thus diet. This identity factor is envied – to such an extent that the production of Mediterranean products is expanding and even relocating to other parts of the world where the climate and soil are favourable.

Given the apparent fragility of this identity marker, ensuring the safety of foods produced in the Mediterranean region becomes a major economic imperative.

The purpose of this annual report is to analyse food safety in the Mediterranean zone by studying hazards, analysing consumer perceptions, specifying the role played by food safety in market construction and, finally, presenting the policies implemented in the field.

Rather than being confined to general presentations, the report endeavours to bring further insight into the place held by milk products and milk derivatives in the political objective of ensuring food safety. Examples of how the milk industry is organised in several countries complete the picture.

As has been the case in previous years, the annual report includes agricultural development indicators for the countries around the Mediterranean. The CIHEAM wishes to thank both the authors, who agreed enthusiastically to join forces to investigate these subjects, and the Presses de Sciences Po team of editors, who contributed their skills and expertise to this editorial project.

Our thanks also go to Mahmoud Allaya, who kindly undertook to design and supervise this report.

*Mediterra 2007* will be accessible in 2008 on the CIHEAM and Mediterranean Observatory websites:

- <http://www.medobs.org>
- <http://www.ciheam.org>

Bertrand Hervieu  
CIHEAM Secretary General

# CONTRIBUTORS

---



**Direction:** Bertrand HERVIEU, CIHEAM Secretary General.

**Coordination:** Mahmoud ALLAYA, CIHEAM-IAM Montpellier, France.

**Authors:**

Akka AIT EL MEKKI, Department of Rural Economics, ENA Meknes, Morocco.

Luis Miguel ALBISU, Unidad economía agroalimentaria, CITA, Gobierno de Aragon, Spain.

Julien FRAYSSIGNES, UMR Dynamiques rurales, ENSA Toulouse, France.

Jean-Louis MAUBOIS, INRA Rennes, France.

Samir MILL, Consejo superior de investigaciones científicas, Madrid, Spain.

Daniele RAMA, Osservatorio sul mercato dei prodotti lattiero-caseari, Cremona, Italy.

Jean-Louis RASTOIN, UMR Moisa, Agro Montpellier, France.

Gabrielle RUCHETON, CIHEAM-IAM Montpellier, France.

Mercedes SANCHEZ, Universidad publica de Navarra, Pamplona, Spain.

Ana Isabel SANJUAN, Unidad economía agroalimentaria, CITA, Gobierno de Aragon, Spain.

Lokman ZAIBET, Mograne Agricultural College, Tunisia.

**Translations from French into English:** Carolyn G. LOANE.

**Translations from English into French:** Thérèse ZAREMBA-MARTIN.

**Maps:** Patrice MITRANO, Atelier de cartographie de Sciences Po, Paris.

**Compilation:** Isabelle FERRIER.



# ABBREVIATIONS AND acronyms

<b>ACE</b>	Angiotensin Converting Enzyme
<b>AESA</b>	Spanish food safety agency
<b>AFI</b>	Agricultural and Food Industries
<b>AFNOR</b>	French standardization association
<b>AGEA</b>	Agency of the Ministry of Agriculture
<b>AIDS</b>	Acquired Immunodeficiency Syndrome
<b>AIMA</b>	Agency of the Ministry of Agriculture (now called AGEA)
<b>AOC</b>	French “Appellation d’Origine Contrôlée”
<b>BMI</b>	Body Mass Index
<b>BPREA</b>	Farm manager’s certificate
<b>BRC</b>	British Retail Consortium
<b>BSE</b>	Bovine Spongiform Encephalopathy
<b>CAC</b>	Codex Alimentarius Commission
<b>CADs</b>	Sustainable farming contracts
<b>CAP</b>	Common Agricultural Policy
<b>CIFRE</b>	Industrial agreement on training through research
<b>CLA</b>	Conjugated Linoleic Acid
<b>CLML</b>	Moroccan milk processing plant
<b>CMO</b>	Common Market Organisation
<b>CMP</b>	Caseinomacropptide
<b>CNA</b>	National Food council (France)
<b>CNAOL</b>	National council for designation of origin of milk products
<b>CNIEL</b>	National inter-trade centre for the milk economy
<b>CPC</b>	Certificate of product conformity
<b>CREDOC</b>	French research center for the study and monitoring of living standards
<b>CTAA</b>	Agro-food technical center (Tunisia)
<b>CTEs</b>	Regional farming contracts
<b>CTC</b>	Technical advisory committee (Tunisia)
<b>DG</b>	Directorate General
<b>Dh</b>	Moroccan dirham
<b>DIRCE</b>	Central directorate for enterprise (Spain)
<b>DNA</b>	Desoxyribonucleic Acid
<b>DO</b>	Denominations of Origin
<b>DT</b>	Tunisian Dinar

EAGGF	European Agricultural Guidance and Guarantee Fund
EARL	Limited liability agricultural holdings (France)
ECHI	European Community Health Indicators
EEC	European Economic Community
EFET	Greek food authority
EFSA	European Food Safety Authority
ESB	= BSE
EU	European Union
FAO	Food and Agricultural Organisation
FDA	Food and Drug Administration (USA)
FENIL	Federation of dairy industries (Spain)
FME	Fresh Milk Equivalent
FODEC	Fund for developing competitiveness (Tunisia)
FOS	Fructooligosaccharides
GAC	General Agricultural Census
GAEC	Collective farming groupings (France)
GAP	Good Agricultural Practices
GFSI	Global Food Safety Initiative
GIs	Geographical Indications
GMO	Genetically Modified Organism
GMP	Good Manufacturing Practices
GOS	Galactooligosaccharides
HACCP	Hazard Analysis and Control of Critical Points
HIV	Human Immunodeficiency Virus
ICEX	Customs authority and Spanish institute for foreign trade
IFOAM	International Federation of Organic Agriculture Movements
IFS	International Food Standard
IMF	International Monetary Fund
INAO	French national institute for the designation of origin
INE	National statistical institute of Spain
INLAC	Inter-trade organization in the milk sector (Spain)
INNNTA	National institute of nutrition and food technology (Tunisia)
INORPI	National institute for standardization and industrial property (Tunisia)
INSEE	National institute of statistics and economic research (France)
INRA	National institute of agronomic research (France)
IRI	International Research Institute
IS	Indication of Source (Tunisia)
ISMEA	National institute for food and agricultural market (Italy)
ISO	International Standard Organisation
ISTAT	National statistical institute of Italy

ITP	Priority technological investment programme (Tunisia)
JORT	Tunisian government publication
MA	Marketing Authorisation
MAPA	Spanish Ministry of Agriculture, fisheries and food
MBP	Milk Basic Proteins
MD	Millenium for Development
MES	Manufacturing Execution Systems
MMP	Milk and Milk Products
MRL	Maximum Residue Limits
MSA	Malta Standards Authority
MZCP	Mediterranean Zoonoses Control Program (WHO Athens)
NIZO	The Dutch milk research institute
NT	Tunisian standards
OFM	Other Fermented Milks
OIE	World organization for animal health
ONA	Omnium Nord-Africain (Morocco)
OriGIn	Organization for an international Geographical Indications network (WTO/EU)
ORMVA	Agricultural development offices (Morocco)
OV	Output Value
PDO	Protected Designation of Origin
PET	Polyethylene terephtalate
PGI	Protected Geographical Indication
PMN	Upgrading programme (Tunisia)
PNAN	Tunisian food and nutrition programme
PNNS	French government's national nutrition and health programme
PNQ	National programme for promoting quality (Tunisia)
PP	Prices paid to Producers
RDO	Registered Designation of Origin
RECAN	National agrarian accounting network (Spain)
RFID	Radio Frequency Identification
SME/VSE	Small and Medium Enterprises/Very Small Enterprises
SNIMA	Moroccan industrial standardization department
SOFI	The State of Food Insecurity in the world
SPFS	FAO Special Programme on Food Security
SPS	Sanitary and Phytosanitary agreement (FAO/WHO)
TBT	Agreement on Technical Barriers to Trade (WTO)
TRIPS	Agreement on Trade Related aspects of Intellectual Property Rights (WTO)
TS	Technical Specification

TSG	Traditional Specialty Guaranteed
UFC	“Unités Formant Colonies”: French measure of number of bacteria per mL of milk
UGPQ	Programme management unit (Tunisia)
UHT	Uperised milk ; long-life milk
UK	United Kingdom
UNCTAD	United Nations Conference on Trade and Development
UNEDIC	French unemployment insurance fund
UNIDO	United Nations Industrial Development Organisation
US	United States
USDA	United States Department of Agriculture
WFS	World Food Summit
WHO	World Health Organisation
WTO	World Trade Organisation





## INTRODUCTION



In 2002, 11.2 million people were affected by food insecurity in 14 of the 22 Mediterranean countries, i.e. 4% of the population of those countries, and food-based diseases caused the death of 1.8 million people, i.e. 54% of total mortality. Although undernourishment appears to be less widespread in the Mediterranean region (4%) than in other developing regions (14%), the incidence of pathologies related to food, on the other hand, is much higher in the Mediterranean basin (54%) than in the world as a whole (40%). This result is paradoxical, since one of the diets recommended by nutritionists is said to come from the Mediterranean region (the traditional Cretan model).

Consumers are nowadays increasingly concerned about health and food issues, and their concern is reflected in the demand for quality food products and foodstuffs that are safe. Food crises, particularly those occurring in the 1990s, have highlighted the importance of food safety and have prompted the authorities to update the regulations laid down in food legislation and to impose stricter standards with regard to foodstuffs and animal feed. Public consumer protection mechanisms have been strengthened in accordance with the precautionary principle and the principle of traceability. The precautionary principle raises questions of the cost of the measure and of liability: precaution means risk assessment and controls (requiring expenditure) and, as the case may be, impedes the free exchange of goods (which is contrary to EU and WTO regulations and penalises certain economic agents). With regard to identifying risk, the question of the onus of proof of the innocuousness of the product is a current subject of debate. The precautionary principle comes under the public domain, however, and thus incurs the responsibility of the State.

The economic and political interests at stake in food safety are considerable. In Europe, the foodstuff market came close to 830 billion in 2005 and absorbed between 12% and 25% of household budgets, depending on the country. Standards regarding food safety are thus a governance challenge both for the public authorities and for all firms in the food system. Co-regulation between the public and private sectors is necessary if there is to be effective organisation and the objectives in the food safety field are to be met.

As the result of the improvement of transport capacities, trade liberalisation and globalisation, consumers enjoy a wider choice of food products from many geographical origins, and competition amongst suppliers is keener. Consumers are furthermore becoming increasingly demanding with regard to food safety and quality. They also seek diversity and originality. Quality perception and consumer behaviour are complex and elusive issues, however. Products have to meet various requirements concerning technological change and distribution throughout the various food chains. The process

begins with raw agricultural commodities, which are then processed and eventually marketed in special packaging, which is part of the physical presentation. Consumer needs are many and varied and involve numerous services, and consumers' perception of the foods they consume is the outcome of several factors. The overall quality of a food product depends on all of these factors, which include both objective and subjective elements.

In order to meet consumer demand, producers place emphasis on local specialities, whose quality and reputation are related to the region where they are produced, the raw materials used or the specific processes involved in the production process. It is in this context that the Official Quality Identification Marks, Protected Designations of Origin (PDOs), Protected Geographical Indications (PGIs) and Traditional Specialties Guaranteed (TSGs) have been developed in several Mediterranean and European countries.

In Europe, the majority of protected foodstuffs are produced in Mediterranean countries; Italy heads the list with 155 PDOs/PGIs, followed by France with 148. These two countries together account for 42% of the total number of certified quality products manufactured in the European Union. Spain accounts for 13.8% of the total number of certified products and is followed by Portugal (12.8%) and Greece (11.4%). These designations concern mainly cheeses, fruit and vegetables, cereals, fresh meat, oils and fats. The concept of designation of origin concerns a large number of producers around the Mediterranean, providing them with a tool for developing their local products.

The concept of designation of origin thus presents itself as a quality reference and constitutes protection for producers against imitations or relocation. This connection between a product and the area where it is produced provides a particularly advantageous context for regional development; it presupposes that an area be delimited outside which it is legally impossible to produce the product in question. The fact that an origin-labelled product cannot be reproduced elsewhere is its principal asset.

However, a designation of origin not only designates a product or a local area but also refers to a subsector, i.e. a series of actors involved in the manufacturing of the product. The analysis of the milk industries in France, Italy, Spain and Morocco illustrates the positions of the various actors involved with regard to the identity and quality of milk products in various socio-economic contexts in these Mediterranean countries.



**PART ONE**

**THE FOUNDATIONS**

---

of food safety





# RISKS AND FOOD SAFETY IN A CONTEXT OF GLOBALISATION

towards a political and strategic approach\*

*Jean-Louis Rastoin*

From the point of view of consumption at the world level, the agro-industrial model has not yet succeeded in achieving the objective of any food system as defined by the World Food Summit, which was held in Rome under the auspices of the FAO in 1996:

*“... ensuring access for all to available food that is affordable, culturally appropriate and satisfactory in terms of health and nutrition.”*

Progress has undeniably been made, however.

Less than two centuries ago people were dying of hunger en masse in Europe: let us not forget the terrible famine that ravaged Ireland in 1846-1847 killing 1 million people and driving hundreds of thousands to emigrate to North America. And there were ten serious food shortages in France in the 19<sup>th</sup> century. Meanwhile, in addition to food shortages people suffered the ravages of a poor and unbalanced diet or of food-poisoning due to the ingestion of toxic foodstuffs or food that had gone bad. At the beginning of the 20<sup>th</sup> century, for example, the journalist Upton Sinclair described the practices of the Chicago food industry in alarming terms. According to Sinclair, meat that had been lying in the dust and sawdust where workers had been sweating and spitting billions of tuberculosis bacilli was used for sausages, and meat stocked in cold chambers with water running off the roof where there were hundreds of rats running around was also used (Sinclair, 1906).

*Homo sapiens* no doubt established a connection between food and health at an early stage. Hippocrates developed a theory on the subject as early as the 5<sup>th</sup> century BC. Around 1650, the Salerno Medical School implicated the ingestion of rye infested with the ergot fungus in the illness known as “St Anthony’s fire” (erysipelas). It was subsequently established that botulism, scurvy, typhoid fever, cholera, and lead poisoning were food-based diseases, and this led States to introduce legislation on the quality of foodstuffs

---

\* - The author wishes to thank Prof. Sabah Benjelloun of the Hassan II Institute of Agronomic and Veterinary Studies in Rabat, Raoudha Khaldi, Director of the Agro-Food Economy Laboratory of the National Institute of Agronomic Research (INRAT), Tunis, Rabih Lebeche, food policy and health consultants in Algiers, and Dr. Martine Padilla, scientific administrator, and Bénédicte Oberti of the CIHEAM-IAM, for their assistance in the preparation of this chapter.

marketed and thus to devote attention to “food safety”. The law on “food fraud control” in France dates from 1851 (and it was supplemented by the law of 1 August 1905 on fraud and adulteration of products or services). The *Food and Drug Act* was promulgated in the United States in 1906.

The concept of food security also has its history, however. It was forged by the agricultural economists and nutrition specialists of developing countries in the 1960s to denote the objective of the availability of a sufficient quantity of food (in terms of calories and proteins) to feed the population of a country. It should be stated here that this objective is far from being achieved to date since, according to FAO estimations, there were still 852 million people in the world who were undernourished in the period from 2000 to 2002 (de Haen, 2005), i.e. 20% of the population of developing countries. This concept of “quantitative” food security has marked proceedings and debates within the FAO for decades and has inspired several agricultural policies. After the mad cow disease crisis in 1996, the term “food safety” was used in the countries affected, becoming the accepted term in the media, and the food security aspect was virtually forgotten. More recently, several governments and the World Health Organisation (WHO) have drawn attention to the development of veritable pandemics that are attributable to food causes. These are food-based diseases<sup>1</sup> – obesity in particular, but also cardiovascular diseases, diabetes, allergies and certain cancers. According to the WHO, over one billion people were affected by obesity<sup>2</sup> throughout the world in 2006, 30% of them in developing countries. And finally, vitamin and mineral deficiencies are also reported to concern one billion people,<sup>3</sup> particularly children, women and old people, due to malnutrition (Delpech & al., 2005).

According to these figures, there are thus two billion human beings (i.e. one-third of the world population) suffering from disorders related to “unsafe” food.

Food safety is thus obviously a matter of quality. Some experts have tried to make a distinction between *food security* and *food safety*. But these concepts are in fact not to be seen as opposites; on the contrary, they now seem to be complementary. The nutritional transition to an unbalanced diet which has been observed in rich countries in the last 20 years could spread to economies in transition in a context of global convergence of consumption models. Action must thus be taken to combat this drift with the sole objective of public health (Kinsey, 2004).

From now on one should thus talk about food security (or safety) in the North and the South.

To avoid ambiguity we shall use the term “food safety” throughout this document with the following definition: a situation where a country can ensure that its population has

---

1 - Food-based diseases are defined by their cause, the foodstuff or beverage, due to (microbiological, viral, chemical, or physical) contamination or particular composition (excess or deficiency of a nutrient), which generate pathologies. This is not the international disease classification approach of the WHO, a fact which makes measurement difficult, but it is useful in a preventive approach such as the one we have adopted here.

2 - Obesity is the state where the body mass index (BMI) is higher than 30.  $IMC = \text{weight (kg)} \div \text{height in metres squared (m}^2\text{)}$ .

3 - A large proportion of whom are undernourished in the FAO sense.



wholesome food (which does not induce pathologies). This “post-modern” approach is broader than the approach which prevailed following the food accidents in the 1990s, because in addition to undernourishment and the various forms of microbiological, chemical or physical contamination it also includes the risks related to products with an abnormally high sugar, salt or fat content and to a diet that is unbalanced (in terms of quantity and quality) and thus also refers to diet. This definition comprises furthermore issues related to access to food, and in particular the economic conditions (product prices and household incomes).

### **BOX 1 - How is food safety to be measured ?**

The concept of food safety defined above presupposes that nutritional standards be drawn up which correspond to the needs of the human body in order to ensure good health. These standards must thus be established first of all by nutritionists (see WHO and FAO data).

Two complementary approaches must then be adopted:

- on the one hand, the individual food resources in terms of nutrients, vitamins and trace elements (FAO food balance sheets, which are macroeconomic in nature) and the composition of menus (food and nutrition surveys, including budgetary aspects, to be conducted in households) should be assessed;
- and on the other hand the pathologies caused by dietary deficiencies or excesses should be assessed (anthropometric measurements, medical and hospital statistics, morbidity and mortality): these data are collected by the WHO.

And finally, the discrepancies between needs and supplies and the prevalence of diseases provide a basis for international and intra-national comparisons.

There are considerable economic interests at stake in food safety. In Europe, the food-stuff market came close to 830 billion in 2005 and absorbed between 12% and 25% of household budgets, depending on the country. It is a mature market with a low growth rate (between 1% and 2% per year), but it is very stable except in the event of doubt about the quality of a product. In France, for example, the consumption of beef plummeted by 35% during the mad cow crisis; more recently – in 2006 – the bird flu crisis resulted in a 30% drop in poultry demand. Since food consumption is influenced by many different biological, sociological, psychological, and economic factors, it is very difficult to define and achieve the objective of food safety. Furthermore, the industrialisation of food production has totally disrupted age-old points of reference (with new products and new food patterns) and has heightened “eater anxiety”, preparing the way for large-scale crises.

Sociologist C. Fischler sums up the present-day situation very aptly when he says, “Eating and the choice of food have always been marked by uncertainty, anxiety, and fear of two things – poison and shortage. Shortage has virtually been forgotten in our societies; what people are afraid of today are poisons” (Fischler, 2001).

This chapter aims to explain the bases of food safety policy, to describe the content of that policy in Europe and to assess the impact on the actors in the agro-food industries. We shall thus discuss the following issues:

- the concept of food risks and food crises;
- the solutions provided by the public authorities through the precautionary principle and the resulting institutional machinery;
- the strategies adopted by the public authorities and by enterprise to respond to the new psychological and regulatory context created by the demand for safety in the food field.

## Food risks and food crises

The *Le Robert* French dictionary defines ‘risk’ as a possible danger, which is more or less foreseeable. When one goes back to the basic definition of the term, one can, and indeed one must, go beyond the concept of food risk into which researchers and policymakers locked themselves following the ESB crisis in 1996. For the magnitude of the risk which food-based diseases constitute is now out of all proportion to the health accidents connected with the toxic nature of certain foodstuffs.

It was thus agreed that the pathological risks connected with nutrients and thus the “normal” composition of marketable foodstuffs would be included in the term “nutritional risks”.

### Typology of food risks

Food risks can be classed in four categories: biological, chemical, technical and nutrition risks.

The origin of microbiological risks is the contamination of foodstuffs by pathogenic bacteria causing diseases and food infections in man. There are over 200 infectious, bacterial, viral or toxic diseases that are transmitted by food. The most frequent pathologies are botulism (caused by canned food), listeriosis (caused by cheese and prepared meat products), salmonellosis (poultry meat, eggs, raw milk, chocolate), campylobacteriosis (raw milk, undercooked poultry meat, drinking water), enterohemorrhagic *Escherichia coli* infections, cholera (drinking water, rice, vegetables, millet groats, fish and seafood). The presence of moulds in foodstuffs producing mycotoxins (e.g. rye ergot); breeding conditions (e.g. BSE-type prion diseases) can cause illnesses or even – although there is as yet no scientific certainty – genetic manipulation (risks of allergies attributable to GMOs?).

Chemical or environmental risks are caused by pollution of the food chain by chemical substances such as heavy metals, pesticides, nitrates, or dioxins. They thus come from production methods, in particular the intensive farming model.<sup>4</sup> These risks concern not only man, but all of the ecosystems. They can also affect soil and water resources.

<sup>4</sup> - Dioxins are a danger originating in industry rather than in agriculture.



Technical risks occur when agricultural raw materials are being processed into food-stuffs, thus at the agro-food industry stage or during the transport or storage of products. As examples one can cite the presence of foreign bodies in products or a preservation defect following interruption of the cold storage chain in distribution channels (resulting successively in the deterioration of quality, taste or nutritional value followed by the appearance of a biological danger).

Nutrition risks are related to the quantity and quality of food. They occur when the diet departs from the standards defined by nutritionists. Risks can thus be connected with a deficiency or, on the contrary, an excess in relation to those standards. There are thus pathological conditions induced by deficiencies of calories, proteins or other nutrients (vitamins, minerals, trace elements, etc.), which are known as undernourishment. Over-nourishment, on the other hand, is the result of the volume and composition of food-stuffs ingested, which can have an excess content of ingredients that are harmful to the health (such as sugar, salt, fat) for reasons of preservation, taste or satiety.<sup>5</sup> The excessive and exclusive consumption of this type of food (hamburgers, chips, fizzy drinks, etc.) combined with a sedentary lifestyle inevitably leads to obesity and food-based diseases.

There are two important comments to be made about food risks:

- They must be seen in perspective in the context of general morbidity studies.
- A price has to be paid for taking them into account.

## Risk – a variable, subjective and contingent concept

As is suggested by the figures quoted in the introduction to this chapter, the magnitude of food risks is very variable depending on the nature of the risk and the country concerned.

### *Microbiological or “accidental” risks:*

It must be stated with regard to food risk frequency that the rate of mortality due to toxic causes is very low in the European Union (according to the European Commission it is 10 times lower than in the United States). It is estimated in France at less than 2/1,000 of the general mortality rate (Apfelbaum, 1998), i.e. less than 800 cases in 1995 as compared to 16,000 deaths attributable to road accidents and 23,500 deaths from diseases due to alcoholism. An InVS (health observatory) study (Vaillant *et al*, 2004) has established that over 200,000 people were affected by food-based diseases in France every year in the 1990s, resulting in some 14,000 hospital admissions and 460 deaths per year. Bacterial infections (Salmonella, Listeria, Campylobacter) are responsible for the majority of deaths. A European health monitoring system has yet to be established through which comparable statistics could be obtained within the EU<sup>6</sup> and the relevant action to be taken could thus be defined.

<sup>5</sup> - Nutritionists call some food inputs “empty calories”, because they input energy but are devoid of nutrients.

<sup>6</sup> - There is a DG SANCO project entitled “ECHI” (European Community Health Indicators) which dates from 2004 but which has not yet been implemented.

The United States has a system for monitoring food-based toxicological diseases and performing the relevant economic estimations. In 2005, the USDA recorded 76 million cases of gastrointestinal pathology, 325,000 hospital admissions and 5,000 deaths. An inventory carried out on 5 pathogens in 2000 concluded that there were 3.4 million cases, 31,200 hospital admissions, involving a total cost of \$6.9 billion (medical expenditure, compensation for days of work lost, accidents and premature deaths).

**Table 1 - Estimation of costs attributable to certain pathogens, United States, 2000**

Pathogen	Number of cases	Number of hospital admission	Number of deaths	Total cost (mill. US \$)
Campylobacter spp	1,963,141	10,539	99	1,200
Salmonella 5	1,341,873	15,608	553	2,400
E. coli O157	62,458	1,843	52	700
E. coli, non-O157 STEC	31,229	921	26	300
Listeria monocytogenes	2,493	2,298	499	2,300
<b>Total</b>	<b>3,401,194</b>	<b>31,209</b>	<b>1,229</b>	<b>6,900</b>

Source: USDA, ERS, 2004.

According to USDA calculations, the average annual cost of a case of food poisoning that is detected is approximately 2,000 US \$ (Frenzen, 2004).

No official data with the same amount of detail are available on microbiological diseases in the southern and eastern Mediterranean countries. The WHO supplies mortality statistics broken down according to causes. The “pathological diarrhoea” column can give an approximate idea of food infections. In 2002, such infections caused almost 40,000 deaths in the southern and eastern Mediterranean countries, i.e. 2.6% of total mortality (compared to 0.1% in the 8 Mediterranean countries in the EU). According to several unpublished sources, there is a relatively high incidence of food infections in this region. This type of food accident can in fact be attributed to several causes, most of which are more sensitive in the Mediterranean region (Elmi, 2004):

- non-compliance with agricultural, industrial and commercial health standards, whereas these standards are less binding in developing countries than in high-income countries;
- the low standard of living (poverty is the main factor explaining malnutrition);
- changes in lifestyle (meals eaten away from home, street catering in often deplorable sanitary conditions);
- the lack of health education;
- population changes (increase in the sensitive population segments due to ageing, malnutrition, HIV infections);
- the lengthening of the agro-food chains with disruptions in the cold storage chain and the importing of pathogenic germs into new geographic zones;

- intensive crop-growing and animal-farming techniques;
- modifications of microorganisms, with the emergence of virulent strains and resistance to antibiotics.

### *Cognitive mismatch*

In high-income countries, the incidence of pathologies resulting from food accidents has been decreasing sharply for the past century. The discrepancy between the scientific reality of food risks and how those risks are assessed by consumers is tremendous, rather as though social anxiety were progressing as health risks diminish: this is an example of the Tocqueville paradox, which argues that public discontent increases as social inequalities diminish (Cochoy, 2001).

The risk is thus dual in nature. As defined by statisticians, risk is the probability of an adverse effect on the health caused by a quality defect in a foodstuff.<sup>7</sup> That risk will be calculated on the basis of epidemiological criteria. The second definition of risk is related to subjectivity: risk is then not assessed according to statistical tables but according to the probability estimated by the individual on the basis of his own criteria. This is called the “perceived risk”. And it is of course this type of risk that is decisive in consumer behaviour. Marketing specialists talk about the “cognitive mismatch” between the mental representation of a product when it is being purchased and the representation of the product in the memory which results from the accumulation of knowledge (Gallen, 2001).

The difference between perceived risk and real risk becomes apparent in opinion polls. A survey conducted by the Sofres on a sample of 1000 people in France in May 2000 on “the most worrying world problems” placed hunger in the world, AIDS and food security at the same level, ranking lower than environmental degradation and higher than criminal networks. This difference is mainly to be explained by the very special nature of “food products”: they are the only consumer goods (along with drugs) which are ingested and they consequently entail great vigilance on the part of consumers. They are furthermore cultural property. Diet is the product of the history of a social group. Given these two characteristics food products have special status in the world of consumption. There are two further types of factor which explain the above-mentioned difference between real risk and perceived risk. First, psychological factors with the increasing doubt and uncertainty concerning science, which is supposed to be able to solve all problems (Auguste Compe’s positivism) but which is unable to prevent disasters (AIDS, mad cow disease) and is threatened by “sorcerer’s apprentices” (GMOs?). Then, sociological factors resulting from the complexity and magnitude of the risks. The pathogenesis of Creutzfeld-Jacob’s Disease, for instance, is still unexplained to a large extent, and BSE and, more recently, scrapie have affected huge herds and flocks in Europe. At the same time, mentalities in rich countries have developed to such an extent that risk acceptability is steadily decreasing (Laufer, 1993).

---

<sup>7</sup> - The French standardisation association AFNOR defines risk in the food safety field as a “function of probability of a harmful effect on health and of the gravity of that effect resulting from one or several dangers in a foodstuff”.

To this exacerbated perception of risk is added the willingness to pay more for food-stuffs that are presumed to be wholesome and a mainstream demand for environmental and food safety regulations.

As regards the first issue (are consumers prepared to pay too much for products they regard as healthier?), we shall illustrate our point with the results of a survey conducted in the city of Tianjin in China, which has a population of 10 million (Zhang, 2005).

**Table 2 - Willingness to pay for various types of food products,\* China, 2001**

Additional charge accepted	Distribution of replies, in %		
	Vegetables without pesticide residues	Organic products	GMO-free products
< 20%	52	30	24
20% - 40%	14	5	4
40% - 60%	6	4	4
60% - 80%	0	0	0
> 80%	2	0	0
Zero	26	61	68
<b>Total number of replies</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: Zhang (2005). \* Products approved by the Ministry of Agriculture.

With the usual reservations regarding the method used, we see that in China the most decisive risk perceived as that of chemical pollution (74% of the willingness to pay higher prices for untainted products). On the other hand, the majority of persons interviewed refused to pay more for organic products or for products labelled GMO-free. This type of attitude is contingent on the local circumstances, a fact which confirms how extremely sensitive consumers are to their immediate environment and to short-term data.

As we have seen, the willingness to pay is influenced by product marking policy, which in turn leads consumers to seek a government guarantee.

The fact that consumers rely on the State is the result of loss of consumer confidence in producers: citizens have doubts as to whether market mechanisms for ensuring product quality function properly. The essential role played by confidence in commercial relations has been established largely by institutionalist economists and justifies the questioning of neoclassical economic theory. The economy can be considered to be subject to cycles in which “liberal” policies (where an invisible hand ensures that markets operate properly to the satisfaction of all) alternate with “interventionist” policies (where markets are subject to perturbations which cause distortions and deterioration which must be prevented or limited). Under the thrust of several scandals (contaminated blood, mad cow disease and, more recently, in the financial field, the fraudulent collapse of very big firms), it would indeed seem that after 20 years of Thatcher and Reagan-style deregulation we have now entered a phase of return to the State. History does not repeat

itself, however; State intervention will take on new “normative” forms in a “globalised” context. It will also be based on a paradigm that will generate legitimacy and create semantic innovation – two functions that are crucial to democracy. This paradigm is constructed around the famous “precautionary principle”.

**Table 3** - Opinions on the level of regulatory provisions in France, May 2000

Fields of control	Breakdown of replies, in % (Total in each line = 100)		
	Regulatory provisions adequate	Regulatory provisions inadequate	No opinion
Environnement	13	79	8
Food safety	22	71	7
Internet	17	64	19
Workers' rights	29	61	10
Financial markets	21	55	24

Source: SOFRES, opinion poll conducted amongst 1,000 people.

## Twenty years of food crises in Europe

There have always been health accidents that have been attributable to the quality of a foodstuff and have even caused many deaths. These accidents have become crises whenever they have threatened governments by unleashing the anger of public opinion. The unprecedented development of information and communication technologies, which broaden the field of knowledge acquired and accelerate access to that knowledge, is combined with new societal demands such as the right to health. This explosive cocktail has exposed political leaders to serious threats, which have rapidly been taken into account and are now resulting - virtually throughout the world, and particularly in Europe – in far-reaching changes in the institutions concerned.

The specialised literature generally dates from 1996 with the first cases of Creutzfeldt-Jakob's disease attributable to the consumption of beef contaminated with bovine spongiform encephalopathy (BSE), which were identified in the United Kingdom, the first “food crisis”. Yet the number of cases concerned in that crisis and in those which followed was low compared to other recent events, as is shown in the following table:

**Table 4** - Principle food accidents recorded in Western Europe between 1980 and 2000

1981	Spain	Aniline-denatured rapeseed oil – 1,000 deaths
1987	Switzerland	<i>Listeria</i> in cheese – 25 deaths
1992	France	<i>Listeria</i> in prepared meat products – 63 deaths
1996	United Kingdom, France, Germany	CJD/BSE which broke out in 1985 – 96 deaths by the end of 2000
1996	United Kingdom (Scotland)	<i>Escherichia coli</i> in meat
1998	France	Dioxin in milk
1999	Belgium	Dioxin in eggs and poultry meat
1999	France	Coca-Cola pollution (poor quality CO <sub>2</sub> or fungicide for treating pallets?)
2000	France	Soviba/Carrefour BSE

Source: based on Feillet (2002).

There have been no serious food crises<sup>8</sup> in Europe more recently (2001-2005), probably due to two phenomena:

- the establishment of efficient systems for managing food risks (food safety agencies – see *below*);
- media saturation and volatility.

The most serious health accident attributable to a foodstuff in the last 50 years occurred in Spain in 1981 following the consumption of canned food containing adulterated rapeseed oil; several thousand people were poisoned. The listeriosis outbreaks in 1987 and 1992 were also fatal. Yet these disasters did not have any consequences for the government; they were dealt with through administrative channels. The acute awareness of the BSE problem is probably to be explained by the “barbaric” nature of the phenomenon (flesh-eating cows – even cannibals, since they were fed meat meal), by the large-scale dysfunctional problems occurring at both the national and the European level (non-compliance with regulations and absence of sanctions), and by the concurrence of the above-mentioned phenomena (wide media coverage, damage to health). It was not a question of the magnitude of the figures but of the symbolic aspect. The incidents which followed “benefited” from unfailing journalistic vigilance and amplification in the media that was out of all proportion to the *damage* actually caused.<sup>9</sup> We would point out that the dioxin crisis in the poultry sector toppled the Belgian government in 1999.

There is one case which has not been listed but which is nevertheless worth mentioning, since it illustrates the costs induced by food crises. It is the case of benzene found

8 - The only health crisis worthy of note to be attributed to birds (bird flu), which occurred in 2005-2006, did not concern feeding under any circumstances.

9 - This wide media coverage is to be explained in part by the uncertainty as to the risks of an outbreak of new cases of Creutzfeldt-Jacob's Disease and the possible number of victims in the medium term (ranging from several individual cases to several thousand cases).

in “Pschitt” bottles of the Perrier firm. In 1990 the US Food and Drug Administration (FDA) of the United States discovered traces of benzene in a batch of the famous fizzy drink. This incident, which had no health consequence whatever but was given wide media coverage in the US, strongly affected the firm’s financial results and was probably the reason why the group’s assets were sold to Nestlé. Suspicion about a product can thus sink an undertaking.

The case of Snow Brand Milk can be mentioned in the same vein of the undermining of enterprises; several milk products and then the meat products marketed by this cooperative and milk market leader in Japan caused mass food poisoning (over 10,000 people were affected and 10 deaths were reported) in 2000 and 2002. As the result of the tremendous scandal which resulted, the turnover and share price of Snow Brand Milk dropped by 80% and the firm had to carry out vigorous restructuring measures (1,000 jobs were cut and shares were sold) in order not to go out of business altogether.

### **BOX 2 - Food safety in southern and eastern Mediterranean countries: the case of Algeria**

For want of an overview of the Mediterranean region, the situation in Algeria can be analysed, since it is an example which can probably be applied generally to the other countries in the region.

The informal sector in Algeria is estimated at approximately 20% of small craft businesses and cottage industries and 35% of the commercial network (wholesale and retail trade). A very large section of food production and distribution thus falls outside the scope of any technical or economic control. Furthermore, the monitoring machinery is particularly poorly equipped (3,500 government inspectors for 1 million shopkeepers and dealers). And finally, low household purchasing power entails a price squeeze, which means that the costs related to quality are sacrificed. There is thus a high incidence of food-borne diseases – some 300,000 to 500,000 cases a year (between 1% and 1.7% of the population); this is well above the official figures, which report 3,000 to 5,000 cases. There are few casualties, however. The last important episode of food poisoning (botulism) occurred in Setif and Tlemcen in 1998 and resulted in 345 hospital admissions and 42 deaths. Contamination is reported to concern mainly milk products, bakery and confectionery products, poultry meat and couscous. There is a high incidence of collective poisoning at religious ceremonies and celebrations and in university refectories. There is also a significant rate of food contamination by persistent organic pollutants, agrochemicals, industrial waste (heavy metals) and irrigation water (Leceche, 2006).

Such an extent of public institution and private firm vulnerability to relatively minor events raises questions as to the concept of the risks entailed for consumers. For it is consumer purchasing behaviour which in the final analysis triggers the crises, whether at producer or policymaker level.

## A paradoxical question: nutrition risks

Nutrition risks are caused by the shortage or, on the contrary, the overabundance of food.

### *Food shortage and insecurity*

The FAO has for several years been issuing an annual report on the world food situation (de Haen, 2005). The authors of that document point to the objectives of the world food summit (WFS) in 1996, which were repeated in the Millennium for Development (MD) and include “Halving, between 1990 and 2015, the proportion of people who suffer from hunger”. The priority given to reducing hunger is justified by humanitarian, social and economic considerations. For it has been established that hunger and malnutrition cause over half of child deaths, aggravate the fatality rate during pregnancy and delivery, erode the immune system and consequently increase vulnerability to HIV/aids, tuberculosis, malaria and most infectious diseases. Hunger prevents normal schooling, aggravates gender disparities and reduces employment opportunities and asset production (de Haen 2005).

The Mediterranean region is relatively unaffected by the scourge of hunger compared to other developing regions. Undernourishment affected approximately 11 million people in 13 countries in 2001-2003, i.e. 4% of the total population, compared to a rate of 17% for all developing countries (see Table 5) and of 33% in sub-Saharan Africa. The countries worst affected are first and foremost the Palestinian territories (20%) and then the eastern Adriatic coast, followed by Jordan, Morocco and Algeria. It is worrying to observe that after a significant decrease in the number of people who were undernourished in the period from 1970 to 1990 the figures rose again appreciably between 1990 and 2001: +18% in developing countries and +20% in the Mediterranean region. This deterioration is to be attributed mainly to growing poverty. Hunger and low incomes are in fact closely linked, the population segments most affected being peasants (Paalberg, 2002). These figures unfortunately confirm that the WFS and MD objective will not be achieved.

### *Pathologies of dietary excess*

While the above-mentioned viral and microbiological crises have given rise to surges of concern and indeed panic on the part of governments and producers as well as consumers, due to their accidental nature, other risks that are much more formidable given their magnitude have been emerging for several years. They are the pathological risks which are connected with eating habits and thus fall within the field of consumer “free will”. It has been proved through numerous epidemiological studies that overconsumption of sugar and fat and underconsumption of fruit and vegetables combined with lack of physical exercise constitute fertile ground for the development of obesity and food-based diseases (Mendez and Popkin, 2004).

According to the WHO, obesity affected 18% of the population over 15 years of age in Mediterranean countries in 2002 on a scale ranging from 7% in the case of France and



**Table 5 - Number of undernourished persons, 1969-2003**

Country	1969-1971	1979-1981	1990-1992	2001-2003 prov.	% of total population	Evolution 1991-2002
	Millions					%
Albania			0.2	0.2	6	0
Croatia			0.7	0.3	7	- 57
Serbia and Montenegro			0.5	1.1	10	120
Slovenia			0.1	0.1	3	0
<b>Subtotal Eastern Adriatic</b>			<b>1.5</b>	<b>1.7</b>	<b>9</b>	<b>13</b>
Algeria	6.8	1.7	1.3	1.5	5	15
Egypt	9.1	3.6	2.5	2.4	3	- 4
Jordan	0.3	0.1	0.1	0.4	7	300
Lebanon	0.5	0.2	0.1	0.1	3	0
Libya	0.2	0.0	0.0	*	< 2.5	
Morocco	2.5	1.9	1.5	1.9	6	27
Palestine			0,3	0.6	20	100
Syria	1.0	0.3	0.7	0.6	4	- 14
Tunisia	0.6	0.2	0v1	*	< 2.5	
Turkey	1.9	1.4	1.0	2.0	3	100
<b>Subtotal S and E Medit. countries</b>	<b>22.9</b>	<b>9.4</b>	<b>7.6</b>	<b>9.5</b>	<b>4</b>	<b>25</b>
<b>Total Mediterranean countries</b>	<b>22.9</b>	<b>9.4</b>	<b>9.1</b>	<b>11.2</b>	<b>4</b>	<b>23</b>
<b>PVD</b>			<b>4,058.7</b>	<b>4,796.7</b>	<b>17</b>	<b>18</b>

Source: Faostat, Food Security, October 4, 2006.

31% in the case of Egypt. The countries most affected in addition to Egypt are Malta, Jordan and Greece (over 25%). The rates are significantly higher for women (22% compared to 14% for men). By 2010 almost 71 million people over 15 years of age will suffer from this disorder in the 21 Mediterranean countries, i.e. almost 20% of the total adult population. The United States provides an extreme picture of the incidence of an uncontrolled diet: 35% of the population suffering from obesity in 2002, and 46% by 2010 if the current curve continues (see Appendix, map 2).

Overweight is an aggravating factor for a series of illnesses, particularly cardiovascular diseases, which account for 42% of total mortality in all of the Mediterranean

countries, 43% in the southern and eastern Mediterranean countries and 57% in the countries of the eastern Adriatic (see Table 6).

And finally, food-based diseases of microbiological or nutritional origin are reported to be the cause of 54% of deaths in the Mediterranean region, and the trend of this cause of mortality is upward due to a deteriorating diet. This situation is the result of an appreciable change in diet that has taken place relatively rapid (in less than 50 years) (Rastoin, 2005). Greece, which is often cited for the quality of its traditional diet (the famous Cretan model of nutrition) now conforms to the so-called western model (Padilla & al., 2005), a fact which explains the high rate of food-based diseases observed in the country today.

**Table 6 - Estimation of mortality by cause in Mediterranean countries, 2002**

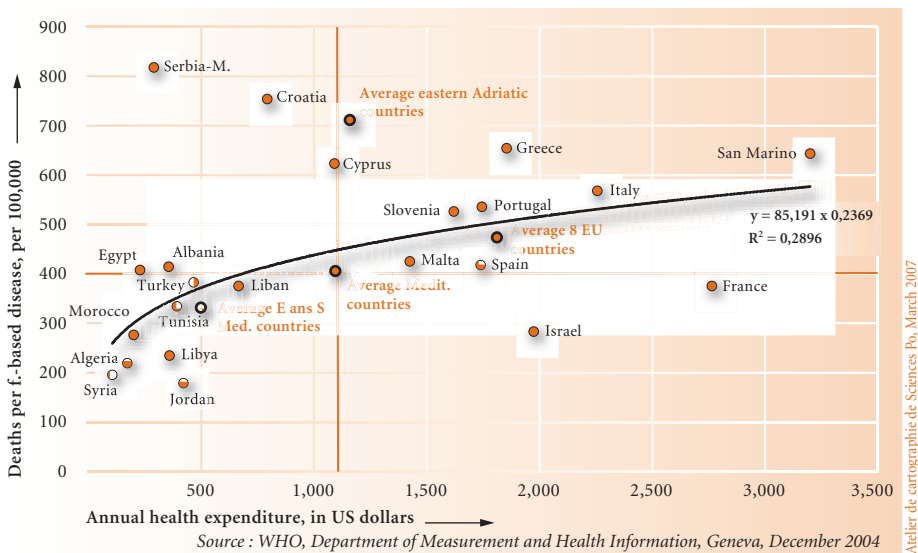
Thousands %	Total 8 EU countries	Total 10 S + E Med. countries	Total 4 East Adriatic	Total 22 Mediterranean countries
<i>Population (000)</i>	180,516	249,946	20,128	450,590
Deaths: all causes	1,644	1,492	212	3,348
Diarrhoeal diseases	1	39	0	40
Nutritional deprivation	5	7	0	11
Stomach cancer	28	11	4	43
Colon and rectum cancers	55	10	5	70
Diabetes	45	26	5	76
Cardio-vascular diseases	630	646	121	1,398
Digestive diseases	75	76	8	160
Subtotal food-based diseases	839	815	143	1,797
Food-based diseases: all causes	51%	55%	67%	54%
Diarrhoeal diseases /Total	0.1%	2.6%	0.1%	1.2%
Cardiovascular diseases / Total	38%	43%	57%	42%

Source: WHO, Department of Measurement & Health Information, Geneva, December 2004.

The situation in each individual country within each geographical subgroup of the Euro-Mediterranean region is mixed (see Appendix, map 1): the case fatality rate for food-based diseases is very high in Serbia-Montenegro and Croatia (over 65% of the total number of deaths in 2002), whereas the incidence rate is lower in Slovenia (57%) and Albania (59%). Of the eastern and southern Mediterranean countries Turkey and Tunisia are greatly affected (62% and 57% respectively), whereas Algeria is less affected in relative terms (39%), and Syria holds a midway position (47%). These disparities confirm the vast range and complexity of the factors involved as well as the need for refined analyses with a view to defining appropriate health policies.

As will be seen from the chart below, the mortality rate has not decreased in line with the level of health expenditure; this would tend to indicate that in the case of this type of pathology prophylactic measures are more effective than providing medical care. In other words, there appears to be a significant correlation between diet and the food production model. Agriculture and the food industry could thus play an important role in each individual country and in each region in the aggravation or prevention of food-based diseases (Hawkes and Ruel, 2006).

**Chart 1 - Mortality attributable to food-based diseases and health expenditure in the Mediterranean countries, 2002**



Atelier de cartographie de Sciences Po, March 2007

To sum up, 11.2 million people in a condition of undernourishment were concerned by food insecurity in 14 of the 22 Mediterranean countries in 2002, i.e. 4% of the population of those countries, whereas food-based diseases caused the death of 1.8 million people, i.e. 54% of total mortality. Although undernourishment appears to be less widespread in the Mediterranean region (4%) than in other developing regions (14%), the incidence of pathologies related to food, on the other hand, is much higher in the Mediterranean basin (54%) than in the world as a whole (40%). This result is paradoxical, since one of the diets recommended by nutritionists is said to come from the Mediterranean region (the traditional Cretan model).

## The precautionary principle and public consumer protection mechanisms

In reaction to the risks incurred by various populations due to the microbiological and viral diseases occurring since 1996, researchers have adapted the concept of the “precautionary principle”, which was originally designed to protect the environment, to the food

issue. However, this principle does not yet concern the other food-based diseases, in particular those resulting from the risk of poisoning related to pesticides or nutrition risks.

## Precautionary principle or confusion principle?

The precautionary principle originated in international discussions on environmental management: conferences on the protection of the North Sea (1987, 1990), the Rio Declaration (1992), the French environment act (1995) and, more recently, the Montreal Conference on GMOs (2000). The precautionary principle was defined as follows at the latter conference: “lack of scientific certainty... shall not prevent... [a] Party from taking a decision... in order to avoid or minimize... potential adverse effects.”

A distinction must be made between “prevention”, which is intended to avoid a real danger resulting from a known and established risk, and “precaution”, which plays a part in situations of uncertainty where one is confronted with suspected risks (Kourilsky Ph., Viney G., 2000). In the food sector 90% of research concerns hypotheses which are being verified and results which have not been demonstrated; it is thus a field where the application of the precautionary principle is liable to be very extensive and indeed excessive.

There are no less than 17 definitions of the precautionary principle to date, which is why some authors talk about the “confusion principle”! The fact that there are so many definitions reveals that there are political and economic issues at stake. For over and above the precautionary principle questions of the cost of the measure and of liability in the event of non-application arise: precaution means risk assessment and controls (which require expenditure) and, as the case may be, impedes the free exchange of goods (contrary to the European<sup>10</sup> and WTO regulations and penalising certain economic agents). With regard to identifying risk, the question of the “onus of proof” of the innocuousness of the product is currently under debate. It must be stated here that the precautionary principle comes under the public domain and thus incurs the responsibility of States. In certain cases there is a marketing authorisation procedure (MA or positive list for drugs and pest control products), and the MA is then financed by the firm applying for authorisation. Where no marketing authorisation is required it is the States which are responsible, and this can reverse the onus of proof to enterprises and thus to consumers (who, as citizens, already pay tax). The precautionary principle is thus very ambivalent (Godard, 2000).

The European Commission has been devoting attention to the problem of the risks related to quality defects in marketed products since 1985 through Directive 85/374 on liability for defective products (but the directive was not incorporated into French law until 1998!). This directive considers that a product is defective “when it does not provide the safety which a person is entitled to expect, taking all circumstances into account, including... the presentation of the product... and the time when the product was put into circulation.” These provisions were relaxed by Directive 92/59 on general

<sup>10</sup> - The Treaty of Rome provides, however, (in Art. 30) that bans on quantitative import (Art. 28) and export (Art. 29) restrictions do not preclude any restrictions which might be justified by reasons of public health or public order.

product safety, which stipulates that “safe product shall mean any product which, under normal or reasonably foreseeable conditions of use, including duration, does not present any risk or only the minimum risks compatible with the product’s use, considered as acceptable and consistent with a high level of protection for the safety and health of persons...” One can well imagine the trial of strength between Commission officials and industry lobbyists and the long nights of gestation of that convoluted text! The concept of “safe” product seems to be more flexible than that of “defective” product, since it allows minimum risks. However, times change and Europe went through the BSE crisis, which led to the White Paper on food safety published by the European Commission on 12 January 2000; this paper laid the groundwork for a veritable food safety policy 40 years after the launching of the CAP but did not establish the essential connection between the two, politics oblige. Significantly, the White Paper is a coproduction of the Directorates-General (DGs) of the Commission responsible for health and consumption and not of the DG responsible for agriculture. Since they did not manage to prepare for the agro-food “bend” in time, most government institutions and agricultural producer organisations are now powerless, cornered by a defensive corporatist attitude.

And finally, the conditions for using the precautionary principle are specified in the Commission Communication issued in connection with the White Paper (Com-2000-1): “The Commission considers that the Community, like other WTO members, has the right to establish the level of protection – particularly of the environment, human, animal and plant health, – that it deems appropriate... where preliminary objective scientific evaluation indicates that there are reasonable grounds for concern... [about] the potentially dangerous effects...”. This Communication serves as a basis for a draft directive of the European Parliament, which stipulates that: the competent authorities will have the power to take the necessary action in a manner proportional to the seriousness of the risk... to apply appropriate measures with a view to banning temporarily for the period needed for the various safety evaluations, checks and controls, the supply, the offer to supply or the display of products when there are specific and corroborating indications that they are potentially dangerous... In this definition, the expert assessment of the level of risk presented by products plays a crucial role and thus again raises the problem of the nature of the risk and the status of the expert. An evaluation based solely on the criteria of the hard sciences (in this case biology) can be simplistic. For the boundaries between facts and values are blurring, on the one hand, and the monopoly of knowledge granted to scientists is being challenged on the other (the point of view of ordinary citizens on a scientific matter can advance knowledge); all scientific knowledge requires “translation” in order to be used locally. It is a question of accessing science and technology by the back door of science in the making rather than by the grand entrance of science made (Latour, 1999). In this context, new mechanisms for assessing and managing risk must thus be devised.

## Institutional food safety mechanisms in Europe and throughout the world

A framework for implementing the precautionary principle was elaborated in international consultations conducted by the FAO and the WHO in the period between 1995 and 1997, in which a distinction is made between three phases in food risk management (Guillon F., 2001):

- risk assessment,
- *risk management* (management proper of risks through appropriate administrative decisions),
- *risk communication* (communication of information on risks).

This approach comprises two innovations: the separate processing of risk evaluation (experts) and risk management (government), integration of the communication phase, which is essential for limiting both individual and collective negative effects of crises.

In Europe this approach is adopted in the White Paper of the European Commission, in which food safety is identified as a high priority in the preamble: “Assuring that the EU has the highest standards of food safety is a key policy priority for the Commission.”<sup>11</sup> A number of proposals are then set out, most of which are currently being implemented:

- creation of a European Food Safety Authority (EFSA);
- introduction of legislation covering food products “from farm to table”;
- coordination of the national quality control systems;
- consumer information (labelling, advertising, nutritional aspects);
- international insertion.<sup>12</sup>

The EFSA was established in January 2002 on the implicit basis of the “socio-technical controversy” model advocated by sociologists, i.e. by organising an exchange of views between scientists, policymakers and citizens with a view to evaluating the situation and preparing a decision. This marks a transition from the “consultation” model to the “core-construction” model (Callon *et al.*, 2001). The EFSA is thus a legal entity that is independent of the Commission: its executive director is accountable to a management board, whose members hail from a wide variety of backgrounds in civil society (14 members, 4 of whom are representatives of consumers and industry). The EFSA also has an Advisory Forum with 15 members (1 representative per country) and a Scientific Committee with 8 panels of independent experts. The EFSA’s missions consist of providing scientific advice, guiding policy and legislation, identifying and analysing food risks at an early stage, assisting the Commission in the event of a crisis, and

11 - This is a statement that was made at a very early stage in Community instruments: it was already stated in Title XIII (Public Health) of Part III of the Treaty of Rome (Community Policies) that “a high level of protection of human health must be secured in defining and implementing all Community policies and actions” (§ 1 of Article 152, formerly Article 129).

12 - Cf. Regulation (EC) No 178/2002 of 28 January 2002 “laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety”.

communicating with the public at large. The authority has 250 officials at its disposal for that purpose as well as a budget of 40 million. Its headquarters has been in Parma since 2005. The founding principles of the EFSA are as follows: independence, excellence, consultation, openness, proactiveness and reactivity. The potential difficulties of the Authority must not be conceded, however: unwieldiness of institutions, as is the case with all European structures (25 countries today, 30 tomorrow?), application of the subsidiarity principle (the EFSA is not authorised to intervene directly but must organise discussions between countries, provide advice and, as the case may be, coordinate activities, as explicitly stated in the White Paper). This “European level” is essential, however, given that food security and safety is an increasingly global problem due to the growing trade in products, intensifying human movements and the strengthening of supranational institutions (see below).

**Table 7 - Government services in charge of food safety in the EU Mediterranean countries**

Country	Name of the institution	Acronym
Cyprus	State General Laboratory, Ministry of Health *	
Spain	Agencia española de seguridad alimentaria	AESA
France	Agence française de sécurité sanitaire des aliments	AFSSA
Greece	Hellenic food authority	EFET
Italy	Comitato nazionale per la sicurezza alimentare	CNSA
Malte	Malta Standards Authority	MSA
Portugal	Agência para a qualidade e segurança alimentar	AQSA
Slovenia	Institut za varovanje zdravja *	

Source: EFSA, 2006 – \* non-specific institution.

In the southern and eastern Mediterranean countries there is no specific machinery for health monitoring, expert advisory services or information in the food field. Food safety is generally the responsibility of the many central administration departments and bodies under the authority of the various ministries.

The food legislation of the European Union has set very ambitious objectives which are sometimes difficult to reconcile:

- guaranteeing a high level of human health and consumer protection,
- guaranteeing the free movement of goods within the internal market,
- basing legislation on scientific proof and risk assessment,
- ensuring the competitiveness of European industry and developing exports,
- delegating responsibility to industrialists, agricultural producers and suppliers,
- ensuring that legislation is coherent, rational and clear,

To quote but one example of the difficulty involved we would point to the contradiction between the application of the precautionary principle, which is necessarily

restrictive in terms of market growth, and EU objectives 2 (guaranteeing the free movement of goods) and 3 (ensuring the competitiveness of industry). A temporary ban on the marketing of a product, however justified from the health point of view, can only reduce the performance of the undertakings concerned (effect on underutilisation of production capacities, loss of clients, deterioration of a firm's image).

The coordination of national systems for monitoring quality and safety would appear to be a restrictive formulation, since 14 out of 25 European States<sup>13</sup> had already created their own food safety agencies or authorities by the beginning of 2006. It is thus now a matter of coordinating particularly complex machinery, particularly since in each country the administrative setup is very elaborate: in France, for instance, there are 13 departments under the authority of 6 ministries attending to the subject!<sup>14</sup> What is more, very large number of actors are concerned: in France again, the "food system" comprises approximately 1.2 million firms and hundreds of public and producer institutions. And finally, the international dimension adds a further constraint. The most urgent task is thus to simplify the national administrative structures in order to facilitate coordination at the European level which is a *sine qua non*.

Consumer information is a recent concern in public institutions, most of which are marked by a technocratic culture and bureaucratic operating methods, which are conducive to a lack of transparency. On the producer side, the natural tendency is to focus on commercial messages in order to stimulate purchases. Yet transparency on objective data that have been established on scientific bases has become an imperative in that underinformation can result in market distortion or reactions of panic. New European directives must be issued on labelling and advertising regulations. The question of health allegations is of great importance, since it is on the borderline between food and medicine and health allegations are very conducive to market growth. The Commission has also set itself the objective of developing information on nutrition. This is a fundamental public health issue given the – amply documented – impact of diet on certain pathologies<sup>15</sup> and thus the prophylactic advantage of a balanced diet such as the Mediterranean diet.

Integration at the international level concerns participation in the governmental institutions of the United Nations which deal with food problems. The following can be cited as the four most important:

- the OIE, World Organisation for Animal Health, which was created in 1884 and whose mission is to monitor animal epidemic diseases with a view to preventing them from spreading from one country to another,

13 - Germany (BgVV, 1994), Belgium (AFSCA, 2000), Spain (AESAs, 2002), Finland (ANA, 2001), France (AFSSA, 1998), Greece (EFET, 2000), Ireland (FSAL, 1998), Netherlands (IGW&V, 2000), Portugal (ASAP, 2000), United Kingdom (FSA, 2000).

14 - The DGCCRF (Directorate General for Competition, Consumption and Fraud Control), which is under the authority of the Ministry of Economic Affairs and Finance, plays a central role in this setup and has demonstrated its ability to create and efficiently implement an early warning system for prevention and crisis management. Logic would now call for specialisation by mission (monitoring of competition on the one hand and consumer protection on the other), whereby the activities and structures belonging to the second component would be grouped under the authority of a special minister.

15 - Cardiovascular diseases, cancers, obesity (it is estimated that approximately 300 million people are pathologically overweight throughout the world, i.e. 5% of the world population), etc.



- the FAO, Food and Agriculture Organisation, which is responsible for questions concerning the production, marketing and consumption of feedingstuffs and foodstuffs (the AFIs come under the UNIDO, a fact which does not facilitate a global approach to the food system),
- the WHO, World Health Organisation,
- The WTO, World Trade Organisation.

All of these institutions help to improve technical or economic knowledge at the world level concerning the sectors for which they are responsible; they act through development projects and take part in the production of standards at the international level. The term 'standard' is used here in the restrictive sense to mean an international agreement on the denomination and specification of goods or services. The importance of this production of standards has become fundamental in the regulation of international trade, since they are applicable to virtually all countries throughout the world and compliance is thus a veritable passport for products, without which they could not circulate.

**Table 8 - Production of standards at the international level in the agro-food field**

FAO-WHO Codex alimentarius	WTO
pesticide registration requirements	Agreement on Sanitary and Phytosanitary Measures (SPS)
product certification	Agreement on intellectual property rights (TRIPS): statements of origin, patents
HACCP (Hazard Analysis and Control of Critical Points), best practices	
Labelling	Agreement on technical barriers to trade commerce (TBT) : Labelling, denominations
Food additives	
Risk assessment	
New foodstuffs	
Food allergies	

In the above table we mention the two most important international institutional mechanisms for food systems. The first is the *Codex alimentarius* Commission (CAC), which was set up in 1963 as a joint FAO/WHO service operating in the form of discussions between government experts and issuing directives which are, in principle, subsequently integrated into the national laws of the member countries (173 in 2006). By 1 July 2005, the CAC had produced more than 202 commercial standards, seven directives on labelling, five on hygiene, 14 on contaminants, 22 on analyses, five on the risks, 38 codes of practice, 2 579 MRLs (maximum residue limits) concerning 213 pesticides, and 377 MRLs concerning 44 veterinary drugs, and it has evaluated 222 food additives leading to 683 provisions. These figures must be placed in perspective considering the

profusion of products in the international nomenclatures of products or of the references that exist in the retail food trade (15,000 food references in a hypermarket, for example). Furthermore, since an international consensus prevailed in the CAC proceedings, the standards, directives and codes of practice correspond to a smaller common denominator. The private machinery for producing standards is systematically more stringent than private regulation.

The second system is that of the WTO with two agreements concerning food safety directly, the SPS and TBT Agreements, and one agreement, the TRIPS Agreement, which needs to be clarified and has an impact on traceability problems (statements of origin) and biotechnology problems (patents). The EU, which is the leading world importer and exporter of food products, should play a decisive role in the international negotiations on food safety. It affirms its intention to impose the high quality standards which apply to its own products on imported products. However, the EU is still the 26th negotiator alongside the 25 member countries, and this weakens its power.

Many empirical studies point to the instant international trade depression effects of the Codex, SPS or TBT type of standardisation, for a certain length of time and funding are needed in order to allow exporters to adapt their products. Subsequently, provided that these adjustments are made, trade is stimulated by any rationalisation effect at both the industrial and the logistic level. The new harmonised European standard for cereals, nuts and dried and canned fruit, for example, which was promulgated in 2002, resulted in a drop of some \$400 million in the export revenue of African countries, i.e. over 50% compared to the previous standard and \$670 million compared to the *Codex alimentarius* norms (Otsuki, Wilson and Sewadeh, 2001, quoted by Wilson and Otsuki, 2003). For exporters the adoption of multilateral standards is preferable to bilateral agreements, which increased adjustment costs. When importing countries adopt the CAC standard for aflatoxins, for instance, as far as cereals or antibiotics for cattle are concerned, this brings a substantial increase in the export revenue of their trading partners (Wilson and Otsuki, 2003).

To sum up, the basic principles of the very recent food policy of the EU should bring about the reorganisation of the system for regulating the food system by strengthening the role given to consumers at all stages of product elaboration. This would bring about a move from a linear revision of the food chain (from the agro-support to the downstream industries) to a concentric vision. Consumers would then no longer be the final element in the chain but the central element to which all food system operators (the agro-supply sector, agriculture, the AFIs, the logistics sector, the distribution channels, public institutions and producer organisations) should devote attention (Feillet, 2002).

An approach of this nature is bound to have an impact on the strategies of all of the actors involved in the European food system.

## Strategies of food system actors

Food safety is a growing consumer demand, which is translated into political terms as a right which the national, European (cf. White Paper above) and international institutions are seeking to guarantee. Hence the – often ambitious – strategies and programmes, of which three examples will be cited here: the WHO global strategy for food safety, the French government’s national nutrition and health programme (PNNS), and the Tunisian food and nutrition programme (PNAN). Undertakings are being called upon to take account of the development of their commercial and regulatory environment, and this is resulting in new strategic positions. In developing countries, a strategy is to be observed in which the attitude to the institutional machinery is negative since it is regarded as providing little incentive or disincentive with regard to the advantages that can be gained through avoidance. In high-income countries two opposing strategies are likely to emerge: the medicinalisation of food by large firms and the development of local specialities by SME/VSE networks.

### Difficulty of the public authorities in translating ideas into priorities for action

At its 53rd World Assembly in 2000 the WHO decided to establish a “global strategy for surveillance of foodborne diseases and food safety” on the grounds that food safety is a public health priority. This programme was published in 2002. It is based on the observation that food-based diseases, particularly obesity, are rapidly spreading but that little reliable and exhaustive information is available for accurately assessing the risks. The first priority is thus to establish a world system for monitoring food-based diseases. Work has been continuing since 2002 to set up a network for providing that service (Foodborne Disease Surveillance), but that network is still far from operational.

At the regional level there is already an initiative of long standing in the field of diseases of animal origin, which deserves mention: the *Mediterranean Zoonoses Control Program* (MZCP) was set up in 1979 and is run by the Athens Office of the WHO. There are 18 Mediterranean and Middle Eastern countries involved in this programme, which works in partnership with the FAO and the OIE (World Organisation for Animal Health). Its mission is to prevent, monitor and control animal and food-based diseases, and its activities have mainly concerned training. The objective of creating an international observatory on food-based diseases is thus far from achieved.

With regard to the goal of improving food safety, the WHS recommends that experts be consulted and clinical studies (meta-analyses) be conducted first of all on the risks involved in the food production system (microbiological and chemical risks or risks resulting from new technologies such as biotechnologies, irradiation, modified-atmosphere packaging) and from the growth of international trade in goods and of human movements. Secondly, the WHO advocates that efforts be made to achieve transparency with regard to consumers and to promote international cooperation. And finally,

capacities must be strengthened for preventing and combating food-based diseases through technical support and the appropriate tools (Hazard Analysis and Control of Critical Points – HACCP) as well as training.

Although the WHO programme deserves credit for drawing attention at the world level to the potential gravity of food-based diseases, it confines itself to generalities, which are no doubt of relevance, but it is difficult to identify concrete actions; the programme has now been running for four years and the results are still disappointing. Targeted regional action vested with significant means – to address the acute problem of obesity, for instance – would probably be a more promising avenue to adapt the world programme to varying situations and make it operational. In view of the assessment presented above, the Mediterranean region could be an interesting laboratory.<sup>16</sup>

The FAO, which has been devoting attention to the food security issue for many years, has set up a more substantial early warning, study and intervention system than that of the WHO. It deals mainly with undernourishment and nutritional deficiencies. We would point to the excellent annual report<sup>17</sup> and online database (FAOstat) on food insecurity, which are two precious tools for monitoring the situation in developing countries. Similarly, good progress has been made in reflection on government policies and recommendations for combating undernourishment (cf. Flores & al., 2005). However, no intergovernmental consensus has yet been reached to provide the funding required for achieving the common WFS and MD objective of halving the number of persons suffering from hunger in the world in the period from 1995 to 2015. Since it was set up in 1995, the *FAO Special Programme on Food Security* (SPFS) has only succeeded in mobilising \$770 million, i.e. \$77 million per year or 9 cents per year per person concerned.

The French government's national nutrition and health programme (PNNS) was launched in 2001 and was an innovation in Europe. In the course of the first PNNS (2001-2006) a frame of reference for nutrition, which had been lacking, was drawn up and communication campaigns were launched which combined the public health objective with the concepts of taste, pleasure and conviviality in keeping with the French food culture. The PNNS, which was inspired by a scientist, Prof. Serge Hercberg, brings together experts, the competent government authorities, producers in the agro-food sector and representatives of social society (associations). The results of the first PNNS is modest: public awareness of food-related pathologies is perceptible, but there is considerable inertia in this field and the figures for food-based diseases are on the increase.

The 2nd PNNS (2006-2010) draws lessons from the first programme and highlights the need to “reforge French nutrition policy” (but is there one?), setting three objectives: first of all, prevention through nutrition education; secondly, disease detection and care for nutritional disorders (obesity, undernutrition); and finally, action targeting the poor. These objectives are combined with quantitative indicators over 5 years

16 - The very recent “National food product safety plan” launched in Algeria (in 2006) with the assistance of the WHO and FAO can be mentioned in this context.

17 - SOFI: The State of Food Insecurity in the world (de Haen, 2005).

(a 20% decrease in the prevalence of overweight, a 25% decrease in the number of “small consumers of fruit and vegetables”, a 5% decrease in the average serum cholesterol level, a 25% increase in the number of people taking physical exercise), organised in nine points of reference with regular monitoring (Étude Nationale Nutrition Santé).

In order to achieve these objectives measures are planned for improving the quality of supply through mechanisms for negotiation and partnership<sup>18</sup> with agro-food industrialists and an observatory monitoring product quality. Communication campaigns are to be launched as of 2007 with the introduction of health messages on food products (advertising in the media and via the large-scale retail trade). An early detection and care system is also planned for obesity as well as specific measures for disadvantaged population segments and support for local action.

The second PNNS thus seems to be well designed and to offer solutions to a lucid assessment of the situation and of the outlook regarding the food issue in France. Its weakness lies in the paltry funding it has been granted: 47 million in 2007, i.e. 30% more than in 2006. This amount must be compared with the 5 billion which agro-food firms invested in product promotion in France in 2005 and the total of more or less \$5 billion which Nestlé has invested in advertising in 100 countries throughout the world in the past 10 years: the ratio is 1 to 100!

In the southern and eastern Mediterranean countries, there are no such tools as the PNNS except in Tunisia. In the 1970s, the countries of the Maghreb and Egypt introduced massive subsidisation for many foodstuffs, the political objective being to maintain internal social stability. Following the structural adjustment programmes imposed by the IMF in the 1970s these countries introduced measures to compensate for the abolition or reduction of the subsidies: free distribution of food or income aids (social safety net, in Algeria). However, in order to avoid a repeat of the “hunger riots” (Cairo 1977, Tunis 1984), the governments in the region have maintained systems of domestic price control for staple commodities (bread and/or wheat flour, sugar, oil, milk). The subsidisation level is still a very high in Egypt, depending on household incomes (over 50% for the poorest population segments). It is thus a macroeconomic mechanism for keeping food available, which is not based directly on the national production system (Heidues & al., 2004). It is also observed that food safety concerns as defined in the present chapter are totally lacking in these policies.

Tunisia is an interesting – and rare – example of measures to take account of the food issue without going as far as integrating agricultural policy into food policy. This country is continuing to act on the prices of several staple foodstuffs, but it also launched action in 1995, the PNAN (National food and nutrition programme), which was an original idea at the time; the objective was to “achieve nutritional well-being for Tunisians on a sustainable basis” by including a nutritional component in development policies. This programme, the first phase of which consisted of assessing food-based diseases,

---

18 -The introduction of economic tools for penalising products that are harmful to the health, such as a tax on sugar and fats, was planned and then abandoned, contrary to what is observed in other countries (United Kingdom, United States).

showed a sharp increase in obesity, high blood pressure, diabetes and cardiovascular diseases in the 1990s. The measures planned by the Tunisian government include encouraging the public to consume local products<sup>19</sup> rather than imported goods, targeting groups at risk, creating nutrition units at the regional level and launching education and communication campaigns. Due to lack of means, the National Institute of Nutrition and Food Technology (INNTA), which is responsible for implementing the PNAN, has confined its action to conducting nutrition surveys, introducing nutritional education in schools and broadcasting awareness-raising programmes on the radio (Dekhili, 2004). So here again there is a gap between laudable intentions and concrete action, which remains limited and whose impact on public health is consequently low.

If a solution is to be found to the very serious problems on hand, food policy must become a real government priority involving consequential budgetary choices. It must be stated that very few countries in the world have adopted a priority of this nature, despite the many warnings given by international organisations (FAO, WHO) and the scientific community. What has been granted for decades to farmers, the occupational category at the very basis of the food chain, still has not been granted to the rest of the population: in France, the PNSS involves public expenditure of less than 1 per capita, whereas agricultural subsidies amounted to 18,300 per agricultural worker in 2005.

## Quality fraud in developing countries

We shall take the case of Morocco to illustrate this problem. The quality issue was broached in this country through a 3-phase analysis (El Mekki & al., 2002):

- the development of quality offences reported by the monitoring authorities by type of product;
- the total number of cases referred to the public prosecution department;
- the legal proceedings taken to deal with these files.

In 1991, 16,674 reports concerning quality fraud were filed in Morocco, and in 1999 the figure was 9,382. These reports involved grain-mill products (flours and pasta), milk, coffees and oils (mainly olive oil). This observation is confirmed by the development of the number of cases referred to the public prosecutor's office (60% of the cases concern these various products). These figures are sometimes well below the real figure due to the decrease in the number of controls carried out since 1996, when the rehabilitation campaign was launched.

There are three factors which can explain the dynamics of quality fraud in the food industry:

- Government price policies: fraud concerning the subsidy granted to flours, for example, the aim being to obtain the advantages connected with the differential in the

---

<sup>19</sup> - Imported products convey the western diet, whose pathological excesses have been underlined.

amounts of compensation paid for the various types of flour. This was the case until 1998, when certain types of flour were still subsidised, particularly national common wheat flour. It is still the case with the quota of 12 million quintals of subsidised national flour, which results in numerous abuses and cases of fraud despite all the deterrent measures taken by the State.

- The economic advantage of fraud due first of all to the non-deterrent effect of the legal sanctions<sup>20</sup> and of an extremely deficient quality control system (inadequate means and lack of staff), and then to low purchasing power and finally to widespread illiteracy and the lack of bodies aiming to educate and defend consumers. Deterioration in quality is in this case a deliberate manoeuvre on the part of the actors involved in agro-food processing, which is in fact a world of preferences, where the actors seek means of achieving their goals (profitability and informal gains).
- The world of structural constraints in which the actors operate and which encourages them to engage in quality fraud. Some operators who are well aware of the constraints (institutional regulations) restricting their possibilities for action are prepared to go beyond these limits or even to change them to their advantage because they are structured and powerful (Hamimaz, 1995).

The vast majority of the quality offence cases referred to the Casablanca Prosecution Department in the period between 1990 and 1995 concerned the milling, milk and coffee industries. The fact that the average number of cases per firm is over one per year shows that the legal penalties are not deterrent. The actors thus have carte blanche to play the non-quality game. Analysis of the connection between non-quality on the one hand and corporate organisation on the other shows that non-quality is a strategy pursued by all actors (in the case of mills and milk-processing firms). In an environment where there is systematic recourse to fraud, even firms which have a relatively advanced organisational structure (in terms of management and quality processes) are forced to engage in a certain non-quality strategy. Non-quality is in fact the result of constraints throughout the sector: supplies, effects of consumer subsidies, perverse effects of fraudulent strategies, competition from the informal sector, etc.

Market deregulation (progressive elimination of consumer subsidies except in the case of certain products for which quotas are laid down, free management of supplies policy (law 12-94), raw material availability) has had mixed effects on non-quality. There are fewer incidents of fraud in the pasta and couscous sectors (use of common wheat flour, spurious colouring) due to competition from imported pasta (good value for money) and the availability of durum wheat semolina. The fruit and vegetable and seafood canning industries have had to cope with hygiene problems and have made considerable efforts because of the quality requirements on export markets. As regards milling plants, there has been a marked decrease in certain types of fraud but other infringements (damp, extraction above the authorised thresholds) have continued and are even on the increase. Instances of watering down are very frequent in the milk processing industry.

---

20 - When sanctions are taken their impact is minimal compared to the potential level of illicit gains or the level of gains obtained.



As regards coffee, the addition of starchy substances and mixtures of figs and chickpeas is encouraged by demand which is extremely elastic in terms of prices and unelastic in terms of quality and by non-deterrent penalties.

It is conceivable that in a completely open market a number of quality constraints will be lifted (as is the case with dairy products in particular), but non-quality is a highly profitable strategy in a market which is dominated by population segments with low purchasing power and where institutional structures for providing support, education, monitoring and justice are ineffective. Furthermore, the minimum conditions for the “consumerist culture” that is necessary if the population is to realise what is at stake in the quality context are still far from being met. For 84% of the male population (taking both the rural and the urban population into account) is either illiterate or has only primary school education. The rate is 86% in major cities. And as regards women, it is 94% and 81% in large cities (1998/99 figures).

Let us now take a look at the pasta and couscous sector as an example of a sector which has been exposed to foreign competition since the end of the 1990s. By comparing three types of information – production, imports and the referral of offence files to the public prosecution department (an indicator of the degree of quality fraud) – we observe a marked decrease in the number of cases referred to the prosecution office, which means that the number of substandard products reported has decreased. Three types of enterprise have been observed over the last 10 years:

- those which have gone out of business completely because they were unable to adapt to the new environment,
- those which are on their way out,
- those (new firms) which survive because they are run by a generation of entrepreneurs who are better informed of manufacturing, management and communication techniques.

In the space of 10 years, 12 factories have gone out of business – 8 of them in the last four years. Most of the managers of these firms have gone into the estate agency business or small catering services – running cafés or snack bars, which are highly profitable low-risk activities, a fact which gives an indication of the career paths of entrepreneurs. Only dynamic entrepreneurs who are prepared to take risks can cope with the competition involved in market liberalisation. In the final analysis, the question is whether this scenario can be extrapolated to sectors that are still relatively protected (milling plants, dairy firms, etc.) and that are developing on oligopolistic markets where, as has already been stated, demand is extremely elastic in terms of prices and unelastic in terms of quality. A tentative answer can be suggested by observing the Moroccan consumer rush on imported milk during Ramadan.

It is not necessarily the case that competition from abroad always brings quality. There is no reason why competitors (such as Turkey, Spain or even agro-food multinationals) should not develop a supply on the domestic market which takes account of the



inadequacies of the institutional monitoring structures and the low purchasing power of the population. Only reliable and efficient institutions will be able to impose the necessary safeguards on competitors and ultimately protect dynamic national industrialists from the unfair competition that can come from “above” (imports or multinational companies) and “below” (small national firms in the informal sector, for which non-quality is a strategy) (Hamimaz, 1995).

## **Food safety presupposes a guarantee as regards health and traceability**

As far as operators are concerned (farmers, industrialists, shopkeepers, officials in institutions), food safety will be guaranteed by a level of product quality and by traceability. For quality is the expression of compliance with standards and regulations that have been laid down on scientific bases. In the event of an incident, traceability makes it possible to locate the origin of the quality defect and thus to take effective action. Product safety and traceability consequently become important factors in the strategies of the actors involved in the food system.

Product quality is a complex concept with many facets ranging from physical-chemical characteristics to cultural components. Anthropologist Cazes-Valette lists seven such facets in the case of food products (to which an eighth must be added), each corresponding to a consumer expectation:

- the nutritional (balance),
- the organoleptic (sense),
- the hygienic (health),
- the functional (service),
- the symbolic (cultural),
- the social (affiliation),
- the humanist (ethics),
- the economic (price) facet.

The health dimension is only one of consumers’ expectations, and its rank varies from one country to another due to the wide diversity of consumption models and of consumer perceptions at not only the national but also the local level. An opinion poll carried out in France by Credoc in February 2001 ranked the criterion “absence of health risks” in third position after the criteria of “taste” and “nutritional value” in the appreciation of the quality of a foodstuff. This type of opinion will of course be influenced by the time factor (degree of recency of a quality accident), the economic situation, the social climate, etc.

Due to the growing sophistication of instruments and methods for monitoring food product quality, the pressure of public opinion and technological advancement in the AFIs, health regulations are tending to become increasingly complex and more demanding on producers,<sup>21</sup> who will have to invest in the elaboration of specifications, new plant and quality control equipment (Mormont M., Van Huylenbroeck G., 2001).

According to the definition proposed by the European Commission, traceability is the “ability to trace and follow a food, feed, or substance through all stages of production, processing and distribution” (CNA, 2001). Traceability is also defined in ISO standards 8402 and 9000. It is a qualifying process using registered identifications, the objective being to ascertain:

- the origin of the product,
- the content of the product,
- the background of the product components and then the background of the finished product up to the final marketing stage.

Since 1 January 2005, EC framework regulation no. 178/2002 of the European Union has required operators involved in the food system to ensure that all foodstuffs, feeding stuffs and their ingredients can be traced throughout the food chain. It applies to all products (irrespective of their origin) and to the 25 member states of the Union. This means that firms must:

- keep records of product flows for five years,
- be able to restore information by setting up a structured system,
- ensure the immediate traceability of the previous and following stages, total traceability being reconstructed by the authorities.

This is a series of very ambitious requirements, which cause firms formidable technical and financial problems – to the extent that by the end of 2004 less than 40% of French agro-food firms considered that they complied with Directive 178/2002 (Tracenet, 2005). All firms will, however, clearly have to comply with the directive in the long run, whether they are located in Europe or do business with European firms. This is a technical type of entry barrier.

Traceability thus concerns all operators in a sector or subsector, from production (including support inputs and packaging) to consumption. Establishing the traceability of a product is thus a delicate operation due on the one hand to the many different factors which must be taken into account and on the other hand to the geographical dispersion of those factors. It can be considered that traceability systems are now operational in the beefmeat sector and, more generally, in the animal sectors, since each individual animal (ruminants, pigs, equids) or each batch of animals (poultry) can be identified. Plant products are more difficult to trace, on the other hand, due to the composite nature of most batches. The situation differs depending on the stage in the food

---

<sup>21</sup> - Transition for producers from a requirement concerning means to a requirement concerning results: cf. Directive EEC 93/43 on the hygiene of foodstuffs.

chain, with good traceability from the agro-food industry to the large-scale retail trade due to the prior regulations in force and the management methods already practised in these sectors, which are dominated by large-scale enterprises. The itinerary from agriculture (where structures are very fragmented) to industry is less well controlled, on the other hand. And finally, tracing agricultural inputs appears to be extremely difficult and to require technical means – particularly computerisation (on-board electronics integrated into automation equipment) – which most farms still lack. Moves have been made, however, and precision farming techniques are likely to develop which will facilitate field traceability.

Traceability entails new tools<sup>22</sup> and new procedures<sup>23</sup> in the management of the enterprises concerned involving the design and data-processing fields, and it also presupposes that the various partners operating within the same sector adopt common standards. It is a matter of being able to locate the origin of an anomaly (upstream traceability) and then, as the case may be, to run a plan for withdrawing the defective products.

A new market is thus emerging, which grew from 0.6 billion in 1997 to almost 2 billion in 2005 (Tracenet, 2005). This market consists mainly of informatics products and services and of laboratories carrying out biological and physico-chemical analyses.

The construction of quality and product traceability are thus valued inputs (and are often compulsory since they are required by government regulations), which generate innovation and activity but for which a price has to be paid. There are thus two questions which arise for firms:

- Who is to provide the service (should it be internalised or externalised)?
- How can the value created be recouped in order to finance the service?

There is very little information available on any relevant studies.<sup>24</sup> Too little is known as yet on the additional costs attributable to food safety. It is to be observed, however, that specialised firms are setting up business to provide these new services, since their implementation will inevitably involve assessment by external experts. For producers and/or distributors can issue their own quality or traceability certification. A private or public third party is required to ensure client confidence by means of information which will be considered credible. The desirable economic status of the certifying body will depend on market structure, as suggested by a study conducted in North America (Crespi and Marette, 2001):

- In the hypothesis of a large number of sellers in a situation of competition where consumer information is inadequate: “private” certification by various bodies where a flat-rate fee is paid per item certified is sufficient and efficient for ensuring that consumers are informed.

22 - Such as the RFID (Radio Frequency Identification) or “smart chip”, which can stock a large amount of data and emit signals to sensors and thus memorise the stages in a path and facilitate inventory management. This product marking technology will eventually replace the bar code (Gencod).

23 - Directive 178/2002 imposes the HACCP risk analysis method.

24 - See Giraud et Halawany, 2006, for a review of the literature on traceability.

- Where there is monopolistic distortion in a branch of industry, only a government certification agency can ensure competition and information.

“External” certification will no longer be sufficient to ensure product differentiation on the market whenever it becomes widespread. Thought will then have to be devoted to strategy in general in order to define the conditions for creating value for the firm. All enterprises that are selling on the markets of high-income countries are concerned as the result of market globalisation. These countries currently account for three-quarters of global commercial food consumption. This conformity obligation consequently causes firms in developing countries a formidable “upgrading” problem.

## The strategic implications of food safety

In the case of public actors, we have seen that food safety has become a top priority issue and political leaders are extremely sensitive to crises, setting up elaborate monitoring and assessment systems, formulating a clever and even populist concept, the precautionary principle, allowing rapid and radical response, and endeavouring to manage communication. Although such measures were certainly necessary after the food crises of the 1990s, there is a possibility of drift, since the precautionary principle and the theory of socio-technical controversy tend to give precedence to the perceived risk rather than the real risk and thus to give probably excessive attention to high-visibility subjects and to devote already limited resources to those issues.

As far as firms are concerned, there are three levels of strategy model relating to food security:

- A basic industrial model, which consists of setting up a series of measurable indicators with a view to complying with public and professional standards (e.g. ISO 9001, ISO 14001 and, since 2005, ISO 22000), bringing certification, and of following a procedure which is now officially recommended in most countries, HACCP, through which industries can monitor the production process themselves with a view to preventing quality incidents.
- A model at level 2, the marketing level, which aims to create a safety image by means of a trademark and communication to the many relays which lead to consumers (opinion leaders, specifiers, distribution channels, the media).
- A level 3 model, which is more demanding since it comes under the strategic approach, which is necessarily global and justified by the objective of “total” product quality in both nutritional, organoleptic and cultural terms.

The industrial model is spreading rapidly, spurred by the “dictate” of standards, which are now one of the fundamentals of the food system (Codron & al., 2006). Control through the standards of the food system is the result of an inverted pyramid structure with a high level of concentration in the downstream industries (large-scale retail trade and agro-food industry). The dominant downstream firms tend to create standards over and above public regulations; these standards screen them from health accidents while

facilitating their role as distributors as well as their ethical or social role. These firms seek to protect their reputation (in order to retain their market share) by externalising the responsibility for product non-conformity to their suppliers and by creating a positive image with their customers (cf. marketing model below). It is difficult to measure the extent of this private standardisation, since no statistics have been published. The phenomenon can be broached, however, by studying ISO certification.<sup>25</sup> There are two global ISO standards concerning the agro-food system – ISO standard 9001: 2000 concerning quality management and ISO standard 14001 dealing with arrangements for respecting the environment – plus a specific standard which was created in 2005: ISO standard 22000 on food product safety. These standards lead to the certification of undertakings.

**Table 9 - ISO 9001 (2000) certification in Mediterranean countries**

Subtotal countries of the eastern Adriatic	64	3,497	55
Subtotal S and E Medit. countries	172	13,751	80
Subtotal EU member states	5,230	160,666	31
<b>Total Mediterranean countries</b>	<b>5,466</b>	<b>177,914</b>	<b>33</b>

Source: ISO, *The ISO Survey-2004*, Geneva, 2005.

By the end of 2004 almost 178,000 firms had obtained ISO 9001 certification in 23 Mediterranean countries, taking all sectors into account.<sup>26</sup> This figure is low compared to the total number of firms (several million) present in those countries. It must be noted, however, that it has been increasing sharply recently (last column in Table 9), with a multiplication factor of 33 (compared to 15 for all of the countries concerned throughout the world – 158 in 2004) and a particularly steep increase in the countries in transition in the region (multiplication factor of 80). Israel ( $\times 221$ ), Greece ( $\times 83$ ), and Turkey ( $\times 70$ ) are the leading southern and eastern Mediterranean countries, with a large number of certified firms (over 1,000 – but this must be compared to the 84,000 Italian firms and the 40,000 Spanish firms with ISO 9001 certification).

**Table 10 - ISO 14001 certification in the Mediterranean countries**

Number of firms certified (all sectors of activity)	Dec. 1999	Dec. 2004	Variation (x)
Subtotal countries of the eastern Adriatic	27	470	17
Subtotal S and E Medit. countries	142	1,021	7
Subtotal EU member states	1,329	14,850	11
<b>Total Mediterranean countries</b>	<b>1,498</b>	<b>16,341</b>	<b>11</b>

Source: ISO, *The ISO Survey-2004*, Geneva, 2005.

25 - ISO: International Standard Organization. The ISO is a network of national standardisation institutes in 157 countries. Its mission is to promulgate international technical agreements aiming to facilitate international trade by creating standards.

26 - The food system accounts for an average of 20% of the total number of businesses.

By the end of 2004 the more recent environmental standard<sup>27</sup> had only been met in 127 countries, 22 of which were Mediterranean. Development is slower: 11 times more firms certified in 2004 than in 1999 in the Mediterranean region as against 6 times more throughout the world. The most active countries in this field are the same as those involved in quality certification (ISO 9000): Italy, Spain, Israel, but also Slovenia, Croatia and Morocco.

Openness to international trade and the dynamism of the domestic economy are clearly powerful incentives for ISO standardisation. On the other hand, standards create distortions of competition because non-certified firms have difficulty becoming referenced with their major clients (the case of the large-scale retail trade in the agro-food sector).

### BOX 3 - Standards relating to food safety: a governance challenge

Food safety has been a matter of concern to industrialists for some time. In the 1960s the North American firm of Pillsbury, one of the leaders in cereal processing, created the HACCP (Hazard Analysis Critical Control Point) method in collaboration with NASA with a view to guaranteeing the quality of the food intended for astronauts. This method was adopted in the FAO/WHO Codex alimentarius as a tool for constructing food safety and was subsequently recommended by the European Commission (Directive 93/43/EC on foodstuff hygiene, which has since been replaced by the “hygiene package” regulations of April 2004, which strengthened the role of the HACCP), and it has been adopted in a large number of countries. Given this very large number of recommendations or requirements, it can be considered that the HACCP method is now a “standard” which is taken into account by the vast majority of agro-food firms in high-income countries and by rapid growth firms in the “formal” sector in developing countries. This very rigorous method provides a means of identifying risks threatening consumer health and establishing procedures for controlling them. It is not in fact a standard, however, but a procedure, and it consequently cannot be certified (Bouton, 2006).

In view of the importance of quality marks for informing consumers and/or the emergence of the precautionary principle, private standards have developed which are generally based on the HACCP method in order to create a certifiable system of reference:

- > EurepGAP, which is a product of the large-scale retail trade, was created in 1997; it is a standard of Good Agricultural Practices (GAP) concerning certain plant products (fruit and vegetables, flowers) and aquaculture. EurepGAP is established in 70 countries.
- > The BRC (British Retail Consortium), which brings together British distributors, has been operating since 1998. The third version of the ‘BRC Global Standard – Food’ dates from April 2002. It concerns industrial suppliers in the large-scale retail trade (mainly those operating with private brands) and is thus a standard of good manufacturing practices (GMP).

27 - ISO standard 9000 was followed by ISO standard 9001, which was redefined in 2000.

- > The IFS (International Food Standard), which dates from 2002, is an initiative of German distributors which was joined by French firms affiliated to the FCD (federation of businesses in the retail and distribution sector): Auchan, Carrefour, Casino, etc.). The IFS specifications are a very close to those of the BRC.
- > The GFSI (Global Food Safety Initiative) is a product of the CIES (International Committee of Food Retail Chains), which was founded in Belgium in 1953 and has since become the Food Business Forum with a membership of 175 agro-food firms in the large-scale retail trade, i.e. the main world leaders in the downstream industries of the food system. The GFSI, which was launched in 2001, is also a standard with a “globalising” ambition, since its motto is: “once audited, accepted everywhere”. The GFSI thus recognizes the BRC and IFS standards.

This profusion of private regulatory mechanisms induced the ISO, which is an inter-governmental organisation, to construct ISO standard 22000. This standard, which is specific to the food sector, should “cap” all of the others, since it makes provision for applying the HACCP procedure in full (12 stages) and is applicable to the entire food chain (agro-supply sector, agriculture, food industries, distribution and related service providers). ISO standard 22000, which was approved by the ISO bodies on 5 July 2005, will comprise 4 components:

- > ISO 22005, concerning the traceability of foodstuffs
- > ISO/TS 22004, a system for managing foodstuff safety
- > ISO/TS 22003, concerning certifying bodies
- > ISO 22002, a system for managing quality in the plant production sector.

It is to be presumed that ISO standard 22000, which is more binding than the previous standards and was constructed together with the GFSI, will become the world reference and will thus confirm the major role played by standards in the control of the food system and will strengthen the power of the very big downstream firms.

The marketing model suggested above (which one can describe as “relational” as opposed to the classical “transactional” model) is an attempt to meet the need to restore consumer confidence, which has been shaken by food crises, for consumers are beginning to doubt the ability of the techno-industrial system to provide food without danger (socio-psychological concept of reassurance). The marketing approach to restore confidence will take effect in several symbolic ways: brand notoriety (massive investments in communication), official or private quality marks (external guarantee), product conformity with social standards (sustainable development trend), familiarity with the product (proximity, a local area, traceability).

A series of major changes clearly have to be integrated into corporate strategy in connection with the food safety issue. It must be borne in mind, however, that strategy goes beyond the limited context of food safety, which, as we have just seen, mainly calls in question corporate production and marketing models. For to pursue a strategy is to take account of the world of competition (otherness), the combinatorial analysis of means (product portfolio, location of activities, form of organisation and mode of governance) and a social project (human group).

On a contemporary food market comprising three segments (see the case of France in Table 11), two strategy models can be identified in a forward-looking approach, which are stylised in the agro-food sector: the globalised mass-consumption model and the proximity model.

**Table 11** - Segmentation of the French food market, 2004

Segment	Turnover (€ billion)	Market share (%)	Average annual growth rate (%)
“Agro-industrial” mass-consumption products	97	75	0-1
“Functional” new products	6	5	15-20
Local products	26	20	5-10
<b>Total</b>	<b>129</b>	<b>100</b>	<b>1-2</b>

Source: our estimations.

Analysis of the strategies of the dominant multinationals in the agro-food sector (mainly the major European firms of Nestlé, Danone, and Unilever), which have been focusing on standardised mass-consumption products that are highly adapted to the target market since the 1970s, shows that these firms have been tending more recently to integrate the second and third segments (new and local products respectively). These major firms are now focusing their product strategies on the health/fitness argument and are consequently developing products with a prophylactic connotation (integrating probiotics, Omega 3, etc.); we call this the “medicinalisation of food”.

One might wonder about the social pertinence of this approach. For diet quality can also be the result of varied and balanced “natural” food involving other choices in terms of production model (short production/distribution chains and factory formats).<sup>28</sup>

The very big agro-food firms, which have considerable marketing expertise, are always on the lookout for arguments which will attract consumers. Since the food crises in the mid 1990s they have thus taken over the “local product” concept following pressure by the large-scale retail trade, which itself rapidly developed distributor brands evoking that concept (e.g. the ‘Reflète de France’ brand of the Carrefour group). More recently, the themes of ethical products or fair trade are also used by marketing departments.

The emerging alternative model is the result of a proximity strategy (Rastoin and Vissac-Charles, 1999); it consists of short production chains (in which local raw materials are processed *in situ*). This has the advantage of ensuring optimal product quality, since access to raw materials is faster, and of reducing energy consumption, since the materials are transported over shorter distances. The second feature is that the firms

<sup>28</sup> - One of the paradoxes, and indeed absurdities, of the agro-industrial food system is that the level of health expenditure in a country like France comes close to that of food expenditure (in 2004, health expenditure accounted for 13% of household budgets, and the growth rate is high, compared to 17% for food expenditure, which is decreasing in relative value). The link between health and food is a long-established fact, on the other hand. In other words, a varied and balanced diet would have a prophylactic effect and would automatically reduce health expenditure!



composing these short chains are average to small in size and network amongst themselves. They share resources and production skills with a view to controlling costs and obtaining access to modern technologies. The fact that they network amongst themselves also means that they can strengthen their marketing capacity by organising logistics and building up baskets of additional products. The third feature, the proximity strategy, uses a production model that is different from the agro-industrial system, being more economical in terms of chemical inputs and thus less pollutant. More and more farmers are returning to organic farming, for example, particularly in developing countries, where intensive agriculture is not yet fully widespread. In Turkey, for instance, the number of organic producers increased from 1,947 in 1996 to 13,082 in 2003, and the acreage concerned increased from 6,789 ha to 203,190 ha (Demirba and Tosun, 2006).

Although the proximity model is not yet widely applied in the food system it is to be presumed that consumer demand for information will grow in the future and that consumers will be aware of the mismatch between the messages issued by major firms (recovery of the symbolic asset, i.e. their image) and the features they expect products to have. There is also likely to be more active lobbying on the part of VSE/SMEs – in an attempt to retain their regional income – and “standardising” action on the part of the public authorities. In these circumstances the local product segment could revert to firms with a legitimate claim in this field, which would strengthen the trend towards an alternative model. There is a favourable basis for such a trend in the Latin European countries given the vast culinary heritage and the large number of designations of origin.

The major challenge in terms of food safety that arises in the proximity model is the ability of the firms concerned to comply with the scientific and technical standards and to carry out rigorous quality controls. It is a challenge which involves extensive investments and good management skills.

## Conclusion

Food safety is a recent concept which comprises both the established concept of food security – focusing on quantitative considerations and developing countries – and the requirements that foodstuffs have nutritional value and present a guarantee as regards health, which emerged in the aftermath of two events that caused market upheaval: the ESB crisis in Europe in 1996 and the global obesity pandemic of which awareness has only grown more recently. The globalisation shock is, so to speak, taking its effect in this field as it is in others.

The paradoxical combination of deprivation and excess of food leads to a “nutritional disorder”, which is now affecting over 2 billion people throughout the world, i.e. one third of the total population, the two scourges being distributed evenly but with great heterogeneity as to region and social class.

The incidence of undernourishment is low in the southern and eastern Mediterranean region (approximately 4% of the regional population is concerned compared to 17%

in developing countries as a whole), but there is high prevalence of food-based diseases (responsible for 54% of total mortality in the Euro-Mediterranean region, compared to 40% throughout the world).

The problems related to food safety are the result of the very specific and sensitive nature of food, which is both a vital and a cultural product. The new dimension which food has acquired as a result of food crises is that of a collective good whose safety and accessibility must be guaranteed: the transition from the autarchic family farming model to the agro-industrial mass-production model within a few centuries has eliminated shortages but has given rise to the fear of collective poisoning, which has triggered food panics.

The result of this contemporary market model has been twofold:

- Mixed public/private regulation and new “hybrid” forms of coordination – food safety agencies – have emerged, which aim to bring experts, citizens and policy-makers together.
- Standardisation systems (mainly with private status) have been set up and in some cases efforts are made to construct quality collectively within production-distribution chains under the thrust of the product traceability requirement.

Food crises have had a considerable impact on food actors in terms of strategy. The production organisation model and marketing policy of firms have been called in question, product profiles have gradually been changed, and product design and marketing costs have increased. The food system is now at the crossroads between the strategy of food “medicinalisation” and diet globalisation pursued by the big multinationals and an alternative avenue based on a strategy of proximity and the development of a basket of local products within the framework of short production chains. These strategies coexist at the present time and will continue to do so for many years to come within the framework of a hybrid food production-processing-distribution-consumption model.

The food crises of the 1990s led to imperative administrative reforms (creation of food safety agencies). However, the new challenge of food-based diseases is slow to supplant obsession with food safety, whereas the economic and social issues at stake are much more important in a context of food pandemics or non-transmittable diseases such as obesity.

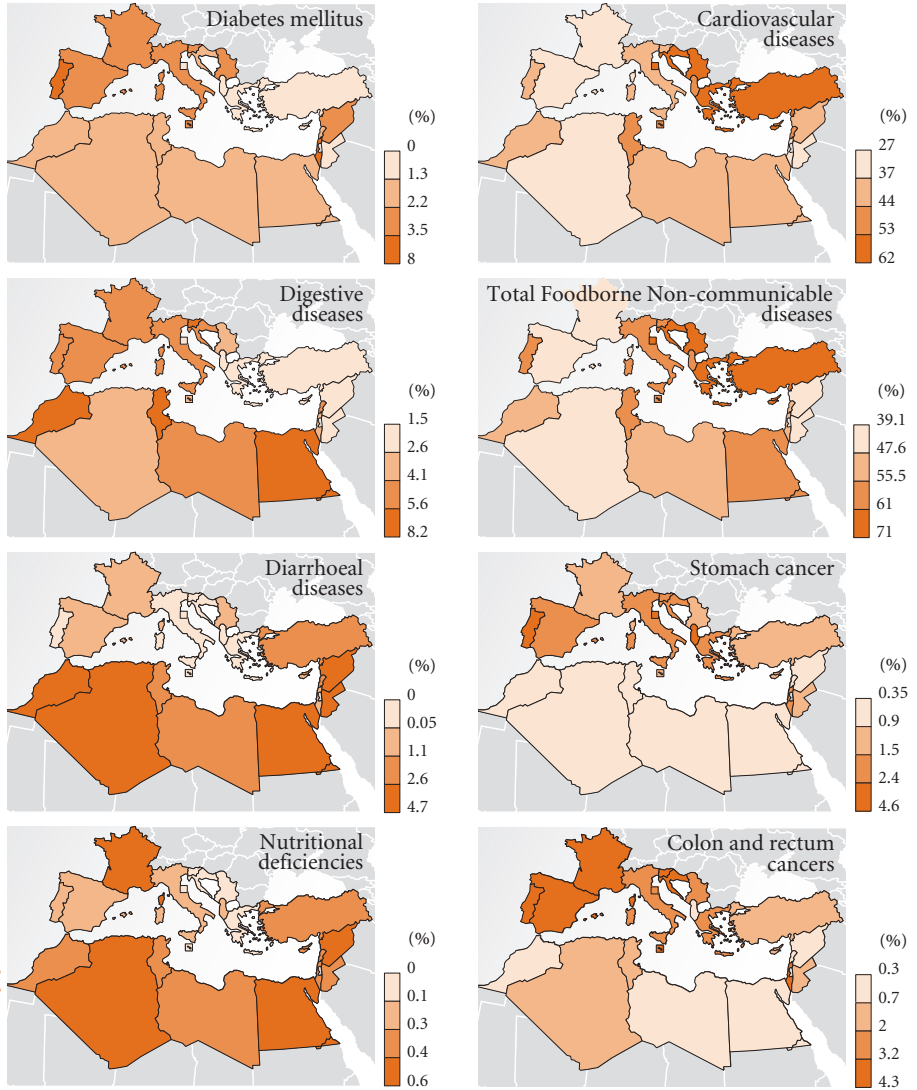
The European Union has now defined its new food policy, which marks an important and long-awaited new phase – the transmission from a supply vision of the agricultural economy to a vision geared to the consumer. Several initiatives such as the national nutrition and health plan (PNNS) of the French government and the national food and nutrition programme of the Tunisian authorities also undeniably mark progress in the understanding of the issue of food-based diseases, but the funding that has been scheduled is still far below the level needed to have any impact on the current predominant trends.

At the international level, the 2002 “WHO food safety strategy” has not progressed beyond the stage of good intentions. Although the FAO is very active in the food insecurity field, tremendous efforts will still have to be made in the context of national and international public policies in order to ensure an individual and collective food balance for the 9 billion inhabitants which our planet will have by 2050.

From this point of view, “food governance”, i.e. the sharing of powers within the food system and of the means of controlling those powers is a fundamental issue. For four conditions must be met if equitable and operational food policies are to be devised and applied: first of all, all of the actors involved (including consumer representatives) must be organised and have reliable and non-asymmetrical information at their disposal; secondly, there must be forms of debate which bring these actors together on an inclusive and balanced basis; thirdly, that debate must lead to the production of legible institutional rules, i.e. rules that operators of all sizes can appropriate; and finally, there must be an active and independent control and sanction mechanism.

# Appendix

**Map 1 - Estimated total deaths, by cause, 2002**



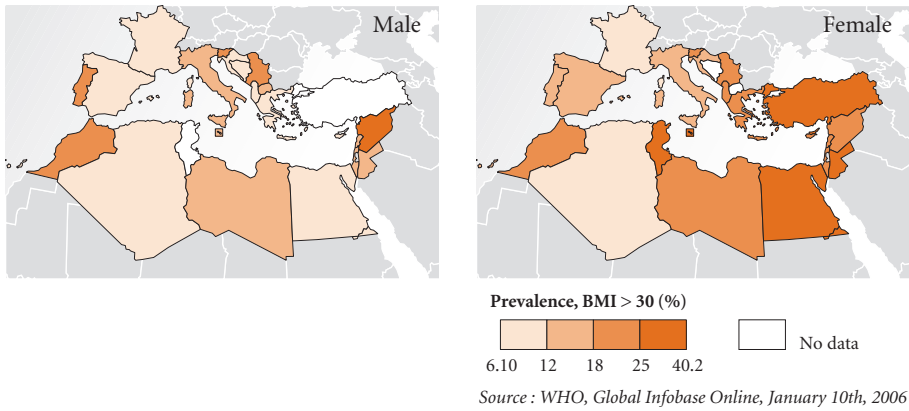
Atelier de cartographie de Sciences Po, March 2007

Source : WHO, Dpt of Measurement & Health Information, Geneva, December 2004

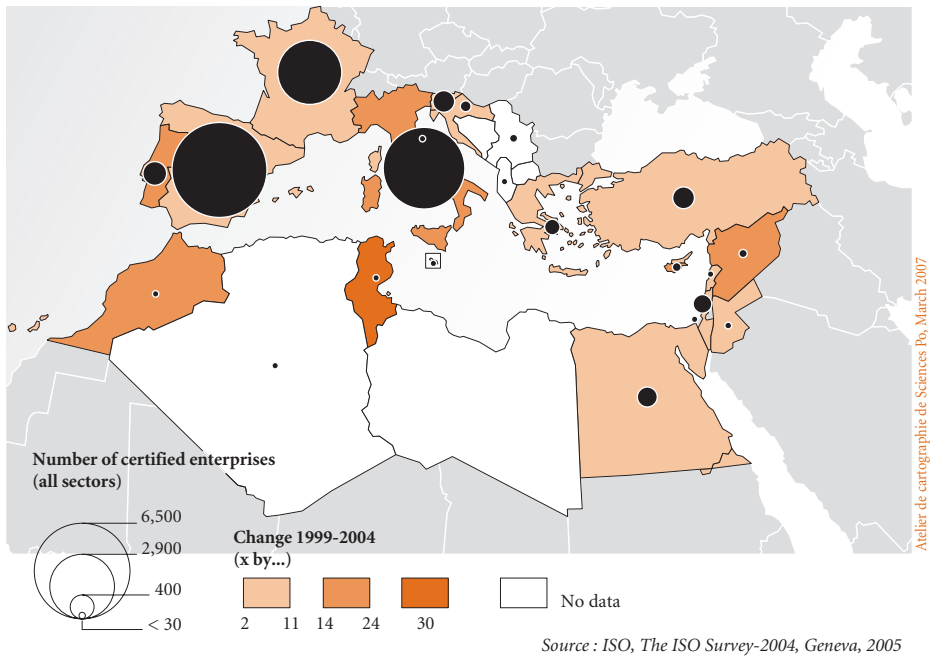
Base 100 : all causes by State

No data

**Map 2 - Prevalence of obesity for age group 15 years and more, 2002**



**Map 3 - ISO 14001 Certifications, 2004**



**Table 12** - Prevalence of undernourishment in total population (%)

SOFI Country groups	1969-1971	1979-1981	1990-1992	1993-1995	1995-1997	2001-2003 provisional	2002-2004 preliminary
<b>World</b>						14	14
<b>Developing world</b>	37	28	20		18	17	17
<b>Asia and the Pacific</b>	41	32	20		17	16	16
East Asia	45	29	16		12	12	12
Oceania							
Southeast Asia	39	26	18		14	12	12
South Asia	37	37	26		23	22	21
<b>Latin America and the Caribbean</b>	20	13	13		11	10	10
North America	12	5	5		5	5	5
Central America	30	20	17		20	20	19
The Caribbean	25	19	27		29	21	21
South America	20	14	14		10	9	9
<b>Near East and North Africa</b>	24	9	8		10	9	9
Near East	21	9	10		13	12	12
North Africa	27	8	4		4	4	4
<b>Sub-Saharan Africa</b>	36	37	35		36	32	33
Central Africa	30	36	36		53	56	57
East Africa	44	35	45		46	39	40
Southern Africa	34	34	48		45	39	39
West Africa	31	39	21	6	17	15	15
<b>Developed world</b>				5		3	< 2.5
<b>Countries in transition</b>				> 2.5		6	6
Baltic States						< 2.5	< 2.5
Eastern Europe						3	3

Source: Faostat, Food Security Database, October 2006.

# QUALITY PERCEPTION AND CONSUMER BEHAVIOUR

*Luis Miguel Albisu*

## Food product quality

International trade is increasing as a result of multilateral and bilateral agreements. A good example is the current trend in trade amongst EU member states, but trade is also taking place amongst both developed and developing neighbour countries throughout the world. Lower international customs barriers are increasing trade flows, and consumers have more opportunities to buy different food products. Most internal geographical and administrative barriers have disappeared in all countries; as a result, food availability has changed because there are larger numbers of products, and the quality offered on the market is also higher due to stronger competition.

On most developed markets there is an abundance of food products from a variety of geographic origins and, in some cases, over long distances. Nowadays it is difficult to predict where competitors are likely to be within the next few years. Improved transport capabilities, together with more liberal policies, are creating new possibilities for fresh and processed food products to reach unexpected markets and to stay longer than has been the case hitherto. Consumer choices are expanding and competition is strong for an increasing number of food suppliers. Competitive markets demand quality products, although the interpretation of this concept varies. An essential task for food suppliers is to ascertain the quality demands of each market.

As a result, quality improvement is a common goal and the concept is constantly referred to, but its precise meaning is quite difficult to grasp. Those who are alert to market reactions try to adjust the quality of any food product to what consumers want, but there are many producers who still believe in the qualities of their own products and fail to take into consideration the markets where they are going to be sold.

On the whole, it is difficult to say to what extent changes in quality are to be ascribed to the product itself or to its economic and social environment. This requires more specific knowledge of what a product means to the consumer and knowing more about the environment in which the food will be consumed. The macroeconomic and social environment can make a big difference when it comes to food quality, but the micro-environment and/or more specific situations can also determine food quality assessments. The same meat, for example, can be evaluated differently if it is consumed in a good restaurant or a less stylish establishment. Is the consumer evaluating only the

quality of the meat or does his assessment refer to the entire environment? The pleasure we get from a wine can be related, *inter alia*, to the occasion on which we drink it. Social celebrations and festivities enhance the perception we have of any food and are an occasion to buy special wines. Should that wine be marketed the same way as other wines?

A food product is a combination of many elements that in the end are evaluated on the market by consumers, but it also undergoes various stages of technical processing and fulfils distribution requirements along the supply chain. The process begins with agricultural raw materials, which are subsequently processed and finally reach the market in a particular physical presentation including the package. In addition, consumers have many needs, which involve a number of services, and their opinion of the food they eat is determined by several factors. The overall quality of a food product is assessed on the basis of all of those factors, which consist of both objective and subjective measurements.

Price is a reference, both on the market and in consumers' minds, which can be taken as the main indicator for evaluating quality. If a consumer pays a high price for a product this implies that its quality is worth the price, irrespective of other factors. Sound evaluation requires repeated consumer trials rather than merely an opinion formed after one single purchase. Food products are more frequently consumed than many other commodities. However, the frequency with which a consumer buys a food product is not necessarily related to its quality but more to the type of product or to the consumer's income. In order for consumers to purchase repetitively they need to be convinced that the product is worth the money, since otherwise they will switch to other food products that give them greater satisfaction.

Market price is the result of a series of values added in the course of the production of the final food product. It is of interest to manufacturers to know the factors on which consumers base their quality judgement, since the investments required in the course of production should correspond to the consumer value assessment. This approach, however, probably runs counter to the general attitude of manufacturers, who tend to consider that their products are of high quality but who may not obtain the final market prices they expect, and their investments may thus have little to do with consumer assessments. It is important for producers to realise that consumers' attitude to food products is often quite different from theirs.

Consumer willingness to pay for food products is an important measure for quality assessment, but it may not correspond directly to foodstuff production costs. In the case of ordinary food products the trade margin between the cost price and the final price is narrow, but high-quality products are a different matter. Consumers may be willing to pay high prices, for whatever reasons, whereas the cost of producing these goods may not be high in comparison to other products.

It is important to position high quality products at high prices because consumers generally associate one with the other. A common mistake is to launch a food product on the market as a high-quality item but at a standard price, since once the product is



classed in a particular price segment it is extremely difficult to make any substantial change in the price. The launching stage is thus crucial, since this is when products are positioned on the market, and repositioning them becomes such an impossible task that manufacturers are forced to launch new products. Marketing activities should therefore be monitored carefully from the outset.

Innovation on the market is highly appreciated by consumers, who constantly seek novelty. Innovation can be brought about through the physical product, the production process and the services relating to the physical product. The price difference between leading products and run-of-the-mill products on saturated markets is quite large, partly because the former offer certain innovations that cannot be found elsewhere.

Agri-foodstuff manufacturers are tending to increase the number of ingredients in the final product. Primitive markets accept food products with single ingredients more easily, whereas products with numerous ingredients abound on more sophisticated markets. There is sometimes one main ingredient that gives the product its name, but it is the combination with other ingredients that makes the difference between market success and failure. This can be the case with chocolate bars, for instance, where the chocolate is mixed with other ingredients that make the quality difference. Thus, for example, chocolate with nuts might be a successful product but if we mix the same chocolate with other ingredients or if we consider it on its own, the quality appreciation may well be different.

A distinction is generally made between the intrinsic and extrinsic attributes of a food product in the assessment of its quality, the purpose being to distinguish between two groups of attributes that have common features but also distinctive characteristics. The differences for some attributes are not so marked but they at least provide a good framework for considering the difference between objective and subjective assessments, the former being more closely linked to intrinsic attributes, the latter generally corresponding to extrinsic attributes.

This chapter is organised as follows: the next two sections explore intrinsic and extrinsic attributes in detail and are followed by three sections which endeavour to explain how quality can be related to processed food products including packaging, the distribution system and the image as important components of those products. A further section is devoted to explaining how consumers behave in response to the various signs of food quality they perceive. We conclude the chapter with comments highlighting its principal ideas and their marketing implications.

## Intrinsic physico-chemical attributes

Intrinsic attributes are usually linked to the physico-chemical characteristics that distinguish a food product. Some of those characteristics, such as colour, shape and many other visual features are easily detected by consumers but may not be appropriately evaluated. It is common for consumers not to know exactly what colour high-quality fresh meat should be.

There are other attributes which are intrinsic to a food product but which have to be detected by physico-chemical analyses in the course of processing. Such attributes can be the consequence of chemical processes that create physical properties such as tenderness, flavour, etc. Taste, however, is usually the most important attribute, but it is only tested when the product is consumed; it is also influenced by the texture of the product and other external factors such as additional information. According to consumer surveys, taste is an essential attribute that must be achieved if a product is to be competitive on the market, but it must be accompanied by many other attributes if the product is to be a success.

Consumers do not seem to consider a food product to be of high quality unless it fulfils their expectations regarding taste. Organoleptic measurements to check variations in taste thus become extremely important; they can vary from one group of consumers to another as well as from one country to another. The evaluation of taste has many socio-cultural connotations, since it is developed over time and is usually quite firmly established in consumers' minds. It is relevant to note that, after living abroad for many years, immigrants have difficulty expressing themselves correctly in their mother tongue but they still keep their preferences for food with the tastes they are familiar with. That is to say, they lose the knowledge of their language before they forget their taste preferences.

Taste is a consequence of physico-chemical attributes but it is also evaluated according to consumers' rational considerations. Health concerns, for example, are important for many consumers. Since animal fats are regarded as negative food characteristics affecting human health, certain consumers try to avoid food products containing them, although they may be very partial to their taste. In their minds they confuse taste references with other positive or negative implications. So we could say that quality has moved from physico-chemical considerations to rational evaluations.

Organoleptic tests can be undertaken with the product itself irrespective of any other information; this is known as blind tasting. They can also be carried out with various information on the product, such as origin, price, package, etc. Consumer evaluations can differ, and this method seeks to determine the impact of external factors and, by rating consumers' reactions according to a scale, the magnitude of that impact. An average product on the market, a top-quality product, or any other factor can be taken as the reference.

Some of these attributes can be tested by consumers before consumption, whereas others are tested after consumption. The former are attributes which can be differentiated by measuring appearance and odour, whereas the latter are more related to taste and texture, amongst other characteristics. In all events, consumers make their own quality judgment, which can be measured in terms of objective parameters. The difficulty lies in correlating objective measurements and the judgments of consumers and experts. Subjective evaluations are complex and not easily translated into objective parameters.

The scientific literature refers to a group of attributes known as 'experience attributes', which are those that consumers can test on the basis of their main references. Some can

be checked before the product is bought, whereas others are rated once the product has been tasted. The former have more impact on the impulse to buy a food product, and the latter have more impact on repetitive buying decisions. The second group is the more important in the final analysis, because attributes that encourage a consumer to buy a product only once are not particularly appealing. This is the pattern with new products that seem to have appeal at first but which consumers subsequently do not buy regularly.

Consumers' reactions must be compared with experts' opinions. Experts can be considered to be persons who are knowledgeable about the product. They can come from many different professional horizons; some may be actors in the supply chain (producers, processors or distributors), but they can also be researchers, journalists, etc. These experts set quality objectives according to their idea of an ideal quality product. This is a difficult task, because their ideas may not correspond to ordinary products on the market or to what consumers want. These standards are not static but are improved as technical improvements are incorporated into the production process. Experts can be regarded as an elite and they also act as opinion leaders. Their public comments can be of great significance for commercial purposes since consumers can be very receptive to their opinions.

The physical characteristics of a finished product also include packaging. Visual considerations are the same as for any other intrinsic attributes but they are also related to extrinsic attributes, which will be defined later. Several characteristics such as size, container shape, ease of handling, storage facility and many other features can be involved in quality perceptions. They can be measured objectively, but the difficulty lies in matching them with subjective evaluations. Packaging can create a consumer's first impression of a product.

Some physical attributes such as the use of a certain type of ingredient in a food product can be stated on the packaging, but consumers may not easily identify its quality attributes because they do not know what it tastes like. The same can occur with many other physical ingredients that have distinctive physico-chemical parameters but that consumers do not fully identify. If consumers are to be in a position to translate physico-chemical characteristics into correct subjective evaluations, they must be given the appropriate education so that they understand exactly what those attributes mean.

Physico-chemical attributes can be highlighted through appropriate information schemes aiming to explain their desirable properties; consumers may believe the information thus conveyed, although they are unable to distinguish the intrinsic characteristics of the attributes. The message must be credible, but in the final analysis it is external factors rather than intrinsic attributes that influence consumer choices. This is a good example of the transition that is currently taking place in consumer choices from intrinsic to extrinsic attributes.

## Extrinsic attributes

The extrinsic attributes of a product are considered to be those which are not so directly related to physical attributes but which consumers take into account when they evaluate the quality of the product, whatever this may mean to the individual consumer. Price is probably the most important extrinsic attribute as an indicator of quality, although it is very common for the relationship between quality and price to be considered to be an acceptance indicator or meaningful relationship, which means that the price, on its own, conveys a different message from that conveyed when it is compared with the quality of the product or the perception of that quality.

In consumer surveys, price is not given the same predominant attention, since consumers say that price is not their first concern. This statement does not often tally with the consumer behaviour revealed by analysis of actual purchasing data. Price segments seem to be determining factors in the sale of products, and there are always price elasticities which to some extent define the quality of products. This disparity between consumer statements and actual consumer behaviour can be interpreted as the consumer response in order to try to avoid worrying about the price – for it is part of human behaviour to try to conceal the reasons for one's decisions.

Origin is another highly rated extrinsic attribute. There are many ways in which origin can be considered, the most common being the country of origin. This means that consumer perceptions of products differ depending on the country they come from. Food products can have different connotations from those of other products, especially with regard to safety. Certain countries, mainly in the developed world, can benefit from the favourable reputation enjoyed by their food safety systems. Other factors, such as animal production in extensive agriculture, can also project a positive image – this is the case with the extensive cattle farming practised in Argentina, for instance.

Other images and perceptions concern more restricted areas such as regions. In these cases, traditional products play an important role because consumers may believe that food products from a specific area are of high quality. This happens more with fruit and vegetables than with other types of product. Climate and soil conditions can significantly influence the differences perceived, particularly if the region offers a specific variety of product or special feature.

The regulations protecting the Designation of Origin (PDO regulations) are the most elaborate protection scheme in this field. In this case the designation of origin is also protected with quality rules for monitoring products and ensuring that they meet minimum standards. This is the most elaborate method of protecting the origin of agricultural commodities, and it has met with widespread success in many EU countries. Promotion campaigns are an additional tool for disseminating information on the extrinsic quality attributes of PDO products.

Shopping location is another influential extrinsic attribute, which will be explained in greater detail later in this essay. It must be considered in relation to the distribution

model and how information is handled. Personal versus non-personal communication between shopkeeper and consumers conditions quality assessments. The number of food products on display, the specialisation of the shop, location and many other factors influence the image consumers have of the shop.

Brand names are equally important in the case of food products as they are for many other products on the market. The difference is that there are not many fresh product brands, although as a result of food crises the number of brands has increased, as has the information provided on the origin of products. As an extrinsic attribute, brand is powerful, but most food brands are weak and their influence is thus limited to restricted geographical areas. Leader brands distributed nationally and internationally are powerful references for most consumers.

Information is becoming the most important extrinsic attribute because it involves many other extrinsic and intrinsic attributes. Information is needed to communicate any attribute and it can be managed in many different ways. The amount of information provided and the credibility of the message are also related to quality signals. The amount of information and the technical aspects that need to be communicated to consumers are further important factors. However, the use of information and its impact have proved to be weak.

Many extrinsic attributes are non-tangible; they attract more attention and are attributed higher value than tangible attributes. Extrinsic attributes are gaining in significance compared to intrinsic attributes; consumers want to know more about the food they eat, which means that more extrinsic attributes need to be developed. They are not easy to evaluate, however, because they have a hidden impact and are intermingled with many other factors.

## **Quality perceptions concerning packaging and presentation**

Packaging is becoming an important part of the product itself. Self-service facilities have transformed packaging into the best way to communicate with consumers. The information provided is also part of the total product quality assessment. Experience shows that consumers are influenced by the amount of information provided and the way it is presented. It was formerly thought that the more information provided the better it was for the consumer. This has not proved to be correct, because the amount of information which consumers assimilate is limited and, in many cases, consumers are not particularly interested in it.

The current trend is to limit the information given but to put it in such a way that it is easy for consumers to read. For example, a former trend was to increase the amount of information relating to nutrition, but the extensive use of technical terms made it difficult for most consumers to understand. Nowadays, less information is given but it

includes, for example, the nutritional value of a spoonful expressed as a percentage of the recommended daily intake.

Information is a must, but not all consumers are sufficiently educated to understand it or be willing to use it. Nutritional labelling is an area where more studies are conducted than in other fields of consumer information. It has been shown that the effect of nutritional labelling is limited and that it has more impact on consumers who are already more aware of such issues. On the other hand, it does not affect consumers who eat a poor diet, since they are not concerned about their food intake. The “best before” date by which the food product should be consumed is the information which consumers check most frequently.

Many consumers prefer to rely on the information expressed by opinion leaders. Nutritionists and doctors play a role here, for example, when they comment on food, even though the information may already have been provided on the package. It depends on the product to be marketed, but charismatic sports celebrities are also used, particularly in the case of high-energy foods or foods for youngsters. The message needs to be credible but it gives a new slant on quality considerations.

Shape and colour are also used to create different quality perceptions. Luxury food manufacturers, for example, try to use shapes that are different from ordinary products, and, understandably, these items tend to be sold in smaller sizes because the unit price is higher. Expensive products are sold in large containers to restaurants, which can then divide the contents into smaller batches or portions. The manufacturers of more ordinary food products have to choose between offering a more differentiated shape of container, at a higher cost, or a standard shape at usually much lower costs.

Package convenience is something that consumers appreciate, and producers try to incorporate novelties such as easy handling and opening. Fruit peel seems to play a role here, citrus fruit being more attractive when it is easy to peel. This is one reason why mandarin oranges have sold more successfully than ordinary oranges to be eaten as fresh fruit. The increase in derived milk product consumption has also been influenced by the convenience factor.

Quality can also be enhanced by selling the right quantity with no waste. The number of single persons living on their own is increasing, so they need package sizes that suit their needs. Larger packages mean that the content will be kept for longer than it should be, with clear consumer dissatisfaction and probable waste. This consumer need has had other consequences, because producers have started to sell food products in smaller portions but at a higher individual price than large portions. This is why it has been made compulsory to quote the selling price per unit on the package in order to enable consumers and make comparisons.

The development of packaging has been the result of new storage facilities in the home such as refrigerators and freezers, but storage also depends on the amount of space

available. Since small homes have greater restrictions than larger ones, consumers can be forced to shop more frequently. Certain shapes are related to certain products. The 'brick' container is related to milk, for instance, with the result that other food producers have had difficulty using these containers and conveying the right message.

The design component of a package is coming to be appreciated more and more. It all depends on the image a food product wants to project, but great attention is paid to design even in the case of ordinary products. More human and capital resources are being dedicated to achieving greater creativity without unduly increasing costs. Design specialists are highly esteemed, and their skills improve product value.

## **The distribution system and food product quality**

Most studies on buying decisions are directly related to food products but the range of foods offered in any shop often determines the consumer's final decision. The distribution channel is thus of utmost importance for both consumer and supplier. Greater opportunities are offered in countries where there is a diversity of distribution channels. It is not enough to differentiate between modern and traditional distribution, because there are many alternatives in each group. It is important to describe these alternatives and to investigate how they relate to perceived food product quality.

Traditional shops can be defined as small shops with attendants who look after the customer in person. There is verbal communication between the parties, and the shopkeeper tries to understand customers' needs and the kind and quality of products they want to buy. Shop size and the human element are determining factors in these outlets, but the age of the shop is also a factor. An old shop that has not been renovated to any great extent, either in terms of physical display or as regards the kind of food offered, or a modern outlet stocking special foods with particular attention to quality can make a big difference in terms of perceived product quality.

Traditional shops do not generally sell poor-quality products; they generally focus on the foods the average consumer wants to buy. They are very careful about product freshness, and stocks are constantly renewed; the owners endeavour to buy the best products at a good price, and they also stock a range of other products in an effort to provide as large an assortment as possible in order to serve their customers. This is why the percentage of fresh products sold in traditional shops is much higher than that of other kinds of food, unlike in self-service shops. These outlets are a typical place to find high-quality food products when one bears in mind that traditional taste is what many consumers want. They also provide convenience because they are usually located close to consumers' homes and the quality of the service compensates for other deficiencies. Consumers are very loyal, as is the case with small bakeries, butcher's shops, and fruit and vegetable shops. It is also interesting to note that this service is provided in small shops located in underground transport services in big cities, where people can shop on their way home. The quality of the personal attention received is very important for

the overall quality assessment, and credibility is an asset that must be preserved in order to compete with supermarkets.

The other type of outlet, which can also be considered within the group of traditional shops, is small in size but the display is totally different. This type of shop is commonly referred to as a specialty shop or “boutique” in order to convey the idea that it sells only a limited amount of food but specialises in certain groups of products and, in some cases, sells high-quality products, which are difficult to find anywhere else, at a very high price. These outlets are also a good channel for traditional products of the highest quality on the market.

Self-service outlets can be subdivided into many different groups, since they target different consumers but also offer different food products. They sometimes offer the same physical products, but the quality is perceived as being different because the level of service offered is different. It is interesting to examine the various models and relate them to the central theme of this essay, which is food quality. Some features are clearly distinguishable, but there are others which depend more on consumer perceptions – consumers may be willing to pay more for certain products or to go to shops where they can find their favourite items.

The main difference between traditional shops and so-called modern distribution is that the latter uses self-service techniques. This means fewer people serving in each shop and different logistics with the widespread use of refrigeration equipment. The size of the shop has major implications for the food range stocked, but many other services offered in each outlet also influence consumer quality perceptions. Another important feature concerning the provision of services is whether the shop is independent or whether it belongs to a distribution chain. It is thus important to know the main characteristics of each distribution model and to specify the kind of services provided, the quality of those services and their impact on consumer perceptions.

The most common outlets are supermarkets of various sizes. In many ways, a small supermarket is a compromise between a small traditional shop and a hypermarket. It offers the same location convenience as a traditional shop, and this characteristic has been of paramount importance in competing with hypermarkets. Many consumers do not want to shop for food more than once a week or want to shop even less often, so they look for places in the vicinity of their homes where they do not need to take the car to go shopping. These outlets generally offer food products at cheaper prices, because they are more efficient businesses than small traditional shops, which need to add high trade margins in order to survive. Supermarkets sell larger volumes and are consequently able to sell at lower unit prices. Leader brands can be found anywhere but are probably cheaper in supermarkets than in traditional shops.

Supermarkets can belong to distribution chains and benefit from the bargaining power these chains have with the agro-food industries in order to obtain quality products at a good price. They can have their own brands, which usually bring higher profits but are



also a means of improving customer loyalty. One of the main advantages of own brands is that they are not burdened with marketing costs such as advertising, and these products compete with other products where such costs have to be covered. The size of the shop does not necessarily correspond to the size of the distribution chain, the most important factor being the total amount of shelf space that a distribution chain has at its disposal.

There are many approaches with respect to own brands and the quality of such products; these approaches depend on the policy of the distribution chain and the image it wants to project. Some distribution chains have several brand names in an attempt to cover several price segments. A common approach is to have a medium-range price and a lower price. They sometimes sell their own brand of food products but at higher prices and offering higher quality. These brands usually include traditional products but fulfil all of the safety conditions that consumers expect nowadays, such as traceability certificates and safety assurance schemes.

The own brand benefits from the image of the establishment as part of its value, so it is difficult to build up good food products with a high reputation as regards quality and price if the shop or distribution chain is not highly regarded. For some reason the level of quality of products of the same brand and that of the rest of the services provided by the distribution channel need to be fairly consistent. Occasionally, when distribution brands are very strong they are able to stipulate their specific requirements with regard to product innovation instead of simply accepting the innovations promoted by manufacturers, but this is not usually the case.

The approach of distribution chains with a large number of hypermarkets may not differ to any great extent from that of distribution chains based on supermarkets. The main difference is that in one single shop there is a wide range of food products with different levels of quality, and some consumers prefer to have that variety. In supermarkets the opposite is the case: they are not usually as big and offer a limited range of products of reasonable quality at low prices. Hard-discount retailers sell mostly through supermarkets and use their own brands extensively. Consumers who patronise these shops rely to a large extent on the products offered and must settle for the selection provided by the distribution chain.

When consumers decide at home where they are going to buy food products they are already taking several decisions concerning the kind of food they want to buy and the quality they are looking for. The underlying principle is that the physical product embraces components including objective and subjective measurements but also services connected with the shop where the food product is sold. Distributors are close to consumers and aware of many of their needs, and they know better than anybody else the food quality that consumers want.

## Image and food quality perception

Image is a further component of any food product and it is part of the total quality assessment. Most people understand the need to improve the quality of physical attributes but rarely realise that images can also be improved. Many agro-food industries call in professionals for a number of technical processes but they rarely have people who work on product image, except in the case of large corporations. Many producers consider that these tasks can be performed by managers who deal with many other general issues.

The fact that most agro-food industries devote the greater part of their time to industrial processes but little effort to marketing activities is probably a consequence of their limited size. The personal ability of the owners of small enterprises is usually the best capacity for building up a product image. Personal relations, with a considerable number of basic but effective communication skills are the best means of creating product images for typical and traditional foods. An important component of the image in this case is the personal credibility of the seller.

Communication is much more than publicity and advertising, which are commonly thought to be the only means of image enhancement. In actual fact, common food product advertising methods may not be the most effective. Public relations and opinion leaders exert quite considerable influence in many instances. The mass media can be an effective medium worldwide for leader brands but not for others. Television advertising has great impact but it is normally extremely expensive unless used on regional and local channels. The cost/benefit ratio for radio programmes, on the other hand, is very favourable.

It all depends on the target audience; however, each communication channel offers advantages and disadvantages. For example, women may have different time or programme preferences from those of men when they watch TV or listen to the radio; the same applies when we compare young people and the older generation, or the educated and those with less education, and so on. Different categories of consumers demand different levels of quality, and it is important to differentiate between those categories but to know how to communicate with them and where they shop in order to reach them at selling points.

The image that an ordinary product wants to project should be quite different from that of a luxury or unusual product. The approach adopted in the case of products that reach wide consumer circles should be different from that adopted in the case of other products that target only small groups or rely on opinion leaders. In the latter case, it is more effective to use professional magazines, either those read by professionals connected with the product advertised or those read by professionals in general. Better knowledge of these issues has significant implications for the choice of communication channel.

An image – whether good or bad – which has been constantly perceived over a long period of time is very difficult to change. This has to do with the fact that most food

attributes are credence attributes or attributes consumers believe in but that for one reason or another cannot be verified. Thus, once they are fixed in consumers' minds they must be replaced by other attributes that are not easy to demonstrate either, and credibility suffers. It is easier to change physical attributes than those affecting the image of a product.

Once a product has a poor quality image it is better to replace it with a new product than to try to improve the original image. The amount of money and time required to change the quality image may not be worth the effort. The opposite is also true, but it is easier to lose a good image than to improve a poor one. It is a process that requires constant investment and planning. The communication needed in order to build up a particular image requires medium – to long-term planning.

Commodities have more unstable images than food product brands. It has been shown that food crises increase the need for food brands. Origin plays an important role because many firms are very small and do not have their own brands or because they have only minor impact and therefore need another sort of umbrella brand, such as origin, in order to be identified. Designation of Origin products are good examples of how products can be recognised and perceived with an improved quality image. The process for developing the quality image is the same for both individual or private brands and umbrella brands.

## Consumer buying decisions

There are many studies and articles that aim to describe consumer behaviour. It is of great importance to know how consumers react to current market circumstances; supply is greater than demand on many markets, and consumers want to diversify their purchases because they get tired of the products they buy. It is also intriguing to know when consumers make a decision about the food they want to buy. Is it at home or at the shopping place? To what extent do they repeat purchases of the same products and brands, and why? When do they grow tired of a product, and why? Do they prefer innovative products or do they stick to traditional products? There are many other questions, and it is crucial to find the right answer if one wants to launch new products and keep them on the market.

Consumers most probably divide their buying decisions between two groups of food products: the ordinary and the unusual. Ordinary food products can be defined as those that are bought on a practically regular basis and where purchasing repetition is high. This can also be applied to seasonal products: certain fruits are bought regularly, for example, when they are in season but obviously are not found in the food basket when they are out of season or too expensive because they are offered at the beginning or the end of a season. This pattern is tending to change with imported goods from many different countries.

A food product that is unusual for one consumer can be quite ordinary for another consumer because it can be found regularly on the market. Products that are not offered regularly on the market can also be included in this category, because the fact that they are being supplied at all is unusual or because the distribution system does not include them in the usual display. Most unusual food products are moving into the category of ordinary products, either because consumers are changing their buying behaviour or the market is able to provide a regular supply.

Consumers may regard regularity of quality as a reason for making a distinction between unusual and ordinary products in their food baskets. This reaction probably concerns fresh products more than other types of product. Regularity can be an important component as can the overall quality evaluation. Competitive markets show that consumers may be prepared to accept food products that are not necessarily of top quality but that they penalise lack of regularity. Most international food brands and restaurants are anxious to preserve regularity in quality.

Consumers in rich countries have the opportunity to travel in their leisure time and thus come into contact with different foods in other regions and countries. People become accustomed to travelling abroad and prefer to stop buying certain commodities in order to continue to spend part of their income and time on travelling, since they derive greater pleasure from travel than from many other buying decisions. Back home they want to continue to eat and drink what they regard as exotic foods so they gradually incorporate them into their eating habits as part of the group of unusual products in their diets.

This trend of coming into contact with unusual foods is also the average pattern for millions of people who move from their native country to another country in search of employment. These persons are emotionally attached to their culinary habits and for years continue to eat the food they used to eat back home. On the other hand, they have to adjust to new food and culinary habits. For many of them the newly incorporated products in the foreign country become ordinary food, and the diets typical of their native countries become unusual food. It all depends on availability in the host country, but their buying behaviour is different from that of people who were born in the host country, and their evaluation of quality is also different.

A food purchase can basically be regarded as an impulse buying decision made at the final stage, i.e. when consumers make the final decision to take the product or to ask for it. Several studies have shown that consumers take, on average, between 15 and 30 seconds to make their choice in supermarkets and self-service facilities. In order to know more about their behaviour some studies use cameras to record consumer purchases and others analyse the time spent in the shop and the number of products bought.

As regards the time spent making the decision to purchase, there is a marked difference between ordinary and unusual food products. In the case of the former, consumers may have quite a precise idea of what they want to buy, although the final decision tends to

be made in the shopping place. And in the case of unusual products, the time spent can be considerably longer because consumers have to look for the goods in the shopping place, depending on the supply found in each shop. This may be part of the attraction for consumers when they move from one distribution chain or shop to another. The distribution chains are aware of this consumer behaviour and try to restrict those movements by sporadically proposing special offers which are unusual for their clients.

There is also a tendency to buy fresh perishable products first and other non-perishables later. The first impression with a fresh product is important because it is the kind of product that is consumed more frequently and, in many cases, daily. This is one of the reasons why this section is placed at the entrance of many super/hypermarkets – a system that brings a high rate of return. One of the greatest difficulties for modern distributors is to remain competitive in terms of quality, since the logistic system is complex compared to that of small traditional shops, which are anxious to obtain the best fresh products on the market.

The time spent by a consumer on purchasing a product is measurable, but it is difficult to know what prompts the final decision. The results of surveys analysing consumer attitudes and buying behaviour do not always tally with actual buying patterns. This discrepancy has been offset through the use of questionnaires including several questions on buying behaviour and measures to check consumer purchases by means of scanner data that modern supermarkets collect at cash desks. In the marketing literature, these comparisons are known as stated versus revealed preferences. The question of how people's buying behaviour works is one of the most intriguing fields of consumer research.

The buying decision process varies depending on the occasion. Thus, the process is not the same if a consumer is trying to buy the food basket for a week or longer or if it is a convenience purchase where the consumer is buying a limited amount of food but for a specific purpose. This is why convenience shops are able to charge higher prices than ordinary shops. Another example is the role that food shelves play at petrol stations; these sales points try to increase the space dedicated to selling food because their customers are satisfied when they find what they want and are not greatly concerned about the price. On these occasions the buying impulse is greater than in other more ordinary shops.

Food buying decisions seem to be more related to food distribution shops since a large proportion of food is eaten in the home, but many people also eat away from home and have to make purchasing decisions in restaurants or other facilities. They either spend a growing share of their income on food served outside the home or they eat at home but eat pre-cooked meals. The common behaviour feature is that they are prepared to eat meals in restaurants and fast-food establishments or from take-away facilities. The concept explained above with regard to the components of a food product can also be applied to eating places where consumers not only eat – a hamburger, for example – but also enjoy the services provided by fast-food restaurants, such as parking spaces and quick service, among many other features; in addition, the image of the restaurant influences their buying behaviour.

In ordinary restaurants, services are also gaining significance because consumers want to eat less for health reasons but are willing to pay more for good ingredients, refined dishes, an appropriate dining environment and good service. Service can be attributed higher value, since it is easier to find good ingredients and differences are not so marked. This is also in line with the current needs of consumers, who seek refinement and sophistication once basic needs have been met.

There are few fresh product brands; these goods are generally displayed with the name of the variety and the origin as a sort of identification tag. However, consumers are demanding more information, and traceability marks have been incorporated as part of the identification system. The level of traceability and the way in which information is provided varies from one product to another, ranging from simple methods to sophisticated bar codes with a large amount of information included or presented on web sites, where consumers can consult both written and visual information. The fact that more brands are being offered on the market is a response aiming to reassure consumers as to the credibility and identification of food products.

Health is a primary concern of many consumers, but this depends inter alia on their age and education. Young consumers are not usually as concerned as older consumers about healthy food product attributes. Educated consumers tend to attach more importance to the impact of food on their health than do less educated consumers. However, modern societies have reduced the gap between these two extremes and most people have access to a great deal of information. The Internet provides a new means of obtaining information on any topic, even if computer skills are limited; the general level of education has risen and people have enough knowledge to be able to seek information on many issues.

Global patterns are disseminated throughout the world due to many factors such as the major influence of the mass media, the growing availability of food products across many countries, and increasing international travel. Consumers consequently buy food that can be found anywhere and look for international brands belonging to multinational companies. However, there are also moves to preserve local food with its distinctive features and special flavours, which are familiar to people living in areas in the vicinity of production sites. Both patterns can survive and successful business can be generated with either of the two. The size of the companies generally differs, since global brands are dominated by large firms whereas regional and local food products are more in the hands of small and medium-sized enterprises.

Consumer buying behaviour and quality evaluation is not the same with local food products as with global brands. In the case of local brands, consumer proximity to production areas means that they attribute higher value to non-tangible attributes which relate food to local environments including culture, heritage, physical settings, history, etc. However, global brands are appreciated not only for their physico-chemical and non-tangible components, but also because they provide a common reference that can be found in many places and consumers trust the firm that produces them.

Safety is another attribute that consumers value highly in their quality scales. The word safety can mean several different things, since both short-term and long-term consequences can be taken into consideration. Good quality includes the idea that what is consumed is safe, since uncertainty is undesirable for most consumers. Short-term effects include fraud and long-term effects have implications for consumers' health. People do not want to live to a very old age, but they have expectations concerning quality of life. Uneasiness is more marked when consumers visit places which are unfamiliar, such as foreign countries, or less hygienic places, such as dubious restaurants. Here the uncertainty stems both from the food and from the eating environment.

## Concluding remarks

Quality would seem to be a prerequisite for the success of any food product on saturated markets where there is a surplus of almost every product. Under these circumstances, quality is the objective to be achieved. The meaning of quality is complex and an issue that is not easily resolved. It varies over time and according to region, so that the same group of consumers can change its quality evaluation of a food product at different moments, and consumers from different countries or geographical areas can also make different quality assessments. Food suppliers should bear this in mind and react accordingly, for we are dealing with dynamic markets where the dividing line between success and failure is narrow. Success in one country does not necessarily mean success in another, and this is a common mistake made by firms that lack export experience and try to extrapolate the results they have obtained in their own countries to other countries.

Although there are many quality attributes that can be measured, the final decision to buy food is made by the consumer with all the human elements that this involves. So in the final analysis subjective measurements prevail over objective measurements. The latter are generally related to intrinsic attributes, whereas subjective perceptions are mainly linked to extrinsic attributes. The borderline between objective and subjective attributes is not clearly defined, but they are complementary and both need to be taken into consideration in order to have an overall idea of food product quality.

The fact that attributes are measurable does not mean that they are easy to measure, since in many cases the result is not worth the effort or time involved. Certain measurements are undertaken when a crisis or problem arises with a view to resolving conflicts and safeguarding consumers' rights. The key issue is to find meaningful attributes that can be monitored regularly by quantitative methods and where the results can be forwarded directly to educated consumers. The amount of information conveyed to consumers should be limited and most of it should be written on the package, since this is the best place to provide it for conscientious consumers. Consumers seem to make only limited use of information and therefore need to be educated about the subject matter if they are to benefit from the information provided on the label, which is a mixture of public policy and private business decisions.



Subjective attributes are the consumer's perceptions and they become more and more complex as consumers become increasingly sophisticated and demanding. They are more difficult to identify, but consumers attach a certain value to them and are willing to pay to have their requirements met. Food producers and distributors who find out what consumers' main subjective attributes are and meet their expectations can probably charge higher prices than their competitors. To a lesser extent, the same happens with objective attributes, which also change according to time and location. This has implications for corporate investments when firms have to produce and distribute food products.

Another way to look at quality evaluations is to begin with the global idea of what a food product means by taking account of all of the phases of production and distribution, from the agricultural ingredients to the final delivery of the product. This process involves producing and processing raw materials and packaging the foodstuffs thus obtained but also taking into account all the services consumers expect with regard to the physical product, and building up a favourable product image by means of comprehensive communication campaigns targeting consumers. This analysis facilitates overall quality assessment and follows the traceability path of product development more closely with more precise ideas about consumers' reactions.

Taste is of utmost importance but most food products have pleasant features, although consumer evaluations differ depending on where they come from and their past experiences. Their cultural background influences buying decisions, and genuine product features have been modified progressively towards less pronounced and identifiable smell and flavour attributes due to preferences for milder organoleptic characteristics. Packaging is a reference that is easily identified by consumers and it is the physical medium on which the brand name appears. It is generally easier to renovate the packaging within a short period of time than it is to renovate the rest of a food product. Innovation is becoming one of the only ways to compete on saturated markets by introducing new products, processes and services.

The closer food product attributes are to consumers' expectations the greater the value assigned to them. Raw materials are thus becoming less and less important, as is the processing process – although to a lesser extent, whereas other services are becoming increasingly important, and the same is happening with image and communication efforts aiming to enhance consumer perceptions of a food product. This approach has important advantages as regards assigning value to the various quality attributes. It also provides a good guide as to where the best investment opportunities are when a food product is being developed.

The agro-food industries complain about the tremendous power wielded by food distribution chains. There are large-scale distributors in many countries and they move large quantities of food products. Distribution chains are able to generate substantial flows of capital, but they are also close to consumers in many areas and are thus able to interpret their response better than anyone else. Consumer wishes and needs are closely related to their quality perceptions, and many of them can be fulfilled through services



where information plays a capital role. Producers should be aware that investment strategies should also be adapted to these service and information needs, the fulfilment of which will add to the consumer's perception of the quality of the final product.

Images influence the decisions we make in our daily lives in many respects. Some are related to countries of origin, whereas others are more closely linked to food product characteristics. Thus there are features which cannot be controlled by a region through regulatory bodies or by an agro-food firm. This field of business – that of creating a product image – has not yet attracted enough attention, but its impact is increasing. It requires long-term investments and clear goals. It is important to convey positive images, but it is crucial to avoid creating negative images or negative consumer perceptions on the market. In this area there is a particular need to increase the number of specialists and to better understand how consumers react.



# FOOD SAFETY AND MARKET NEEDS

*Luis Miguel Albisu*

## A major challenge

In the previous chapter we explained the importance of producing quality products to fulfil market needs and the complexity of evaluating the term 'quality'. On markets where food is abundant, food safety is highly valued by consumers. Food safety is one of the quality attributes that have to be incorporated into production processes and marketing activities in order to compete on most markets. Reducing food risks and negative consumer perceptions is a challenge which the entire agro-food system will have to take up in the future; it involves costs and benefits that must to be assessed by both consumers and policy makers.

Food safety is part of the group of non-tangible food attributes in which consumers are showing growing interest and to which they are attaching increasing importance. It is also a credence food attribute, which means that consumers must believe the information or related communication messages and interpret those messages. Credibility is an important component for credence attributes, and knowledge and perceptions play a major role as significant inputs for final interpretations. Food safety is a consumer need, which consumers regard as an extra service that should be incorporated into a quality product.

Food safety has become a market requirement, and food products sold on competitive markets include either implicitly or explicitly the argument that they are safe. Safety is a particular characteristic that is difficult to measure and control and it can have many different meanings for consumers. Consumers would probably like food products to be totally safe, but this would involve controls that raise production costs. It is important to establish safety levels which strike a balance between costs and benefits. This decision on safety levels involves both objective measurements and subjective perceptions. Society should send the right messages as to consumer willingness to pay for safe food products to be tested in the market place. More information and education on these issues will be necessary in order for consumers to make appropriate assessments.

The benefits obtained from taking precautions in the food safety field depend on expectations concerning the litigation costs avoided, increased market demand and the higher prices that result from selling a safer product. The greatest economic incentive for

producing safer food is the cost associated with unsafe food. This is the main reason why food safety is generally developed in societies with strong institutions and laws protecting consumers. Organised agro-food systems with their respective food companies are other conditioning factors.

Food safety has acquired greater significance as a result of critical food crises, generally on markets with high-income consumers. The wealthier the markets are, the more concern there usually is about food safety. Markets with low-income consumers have different needs relating more to food security, i.e. finding ways and means of providing an adequate supply of food for the entire population. There can be situations where some segments of the population are more concerned about food safety and others about food security. Food safety sometimes can be used as a trade barrier to imports from other countries. However, countries – particularly developing countries – should be aware of the needs of consumers on developed economic markets if they want to sell food products on those markets.

Market needs are essential determinants in the implementation of food safety. There are many other relevant factors which influence final decisions, however. Thus, there are numerous public regulations governing food safety that influence each market, and political decisions have great impact on how social situations are handled. Political decisions are the result of public concern but also of human reactions, which are also connected with public institutions and their credibility amongst voters. Each of these components will be further explained and analysed below. Communication plays an important role throughout this process, and subjective understanding and behaviour vary from country to country and from one consumer group to another.

Wealthy consumers, who can be regarded as average consumers in rich countries, want food product innovation. The agro-food industries are constantly trying to introduce new products on the market in order to be competitive. Some of them are successful but many others are not and have to be withdrawn from the market. These market needs together with various food scandals have had consequences with regard to food safety concerns, and consumers now demand that new products be tested thoroughly before being launched on the market. More novel techniques and procedures, such as food products with genetically modified organisms, are scrutinised more closely and are not easily accepted.

There are various concepts of food safety, and the consequences also vary depending on the time horizon consumers have in mind. Consumers are obviously against fraud, poisoning and manoeuvres to cheat controls, and they are aware of the immediate consequences of these practices on their health. They are also concerned about the long-term health impact of the food they eat, so nutritional components are carefully monitored. They hope to have a long life but they also want quality of life. Taken as a whole, food safety fits well into the culture of the general safety assurance that consumers in rich countries expect. For example, they want to have more money but they are anxious not to waste the money they have and therefore avoid risk in many of their decisions.

In this essay we endeavour to cast some light on the origin of the main concerns about food safety and the various crises that have raised consumer concern. As with any other crises, there are objective elements and subjective perceptions which have to be confronted; this is discussed in the next section. Once a food crisis has been detected, many decisions have to be made, and this stage is crucial to preventing or mitigating further problems; this topic is explained in the subsequent section, which is then followed by three sections dealing with subjects considered relevant to understanding food safety: traceability, genetically modified organisms and institutional arrangements.

The chapter ends with issues more closely related to consumers and their concerns, analysing communication policies and consumer protection rules. Several speculative issues are then discussed in connection with future trends, and a concluding section endeavours to summarise the ideas set out in the previous sections with a view to understanding the main issues around food safety and market needs, which are the main themes of the entire work.

## **Health crises: multiplication and media attention**

No one can deny that there have been several market crises in the past few decades which have been the consequence of food crises. There are many questions and concerns that worry both consumers and policy makers as well as many other agents along the food chains. Are food crises a novelty on our markets? Is our food less safe than the food supplied on the market years ago? Are traditional products safer than new products? Do large firms take less care than small and medium-sized firms? Food crises are given wide coverage in the press and other mass media, and this generally amplifies market impact. It is important to understand the evolution of food crises and how they are connected with market crises. Knowing how they started, how they developed and how they were finally resolved, as well to what extent the magnitudes of market and food crises correspond, can be of great advantage for the future.

Some of the crises have been linked to products sold by large multinational companies, which created a bad image for their products resulting in considerable pressure on their businesses. On such occasions the impact on large markets, and on competitive products from other companies, is limited. This has been the case, for example, with crises linked to various mineral waters and Coca-Cola. The consumption of mineral waters and cola beverages, on the whole, did not suffer to any great extent after the crises, but the companies had serious problems because their products were substituted by other products on the market. Both companies were very concerned about their food-processing problems and tried to identify their weaknesses and initiate safe production processes. As soon as the crises had entered the public domain, they invested huge amounts of money in communication, informing consumers on several markets that their problems were under control and trying to convince them to trust them and their products.

However, the most common situation is where a food crisis affects a product in general, which means that all companies selling the product on the market bear the negative impact. This has been the case with beef and poultry meat; on these occasions joint efforts were required to solve the problems but also to communicate news to markets. Companies adopt different strategies besides complying with public standards. This affects their existing brands and sometimes encourages the creation of new brands. Brands are powerful references on the market, and consumers have perceptions about them which can be regarded as representative company flags for both products and entire businesses. A favourable or poor company image is projected onto its brands and vice versa. One of the outcomes of a food crisis is the subsequent existence of more brands for the same products formerly supplied on the market; this has been the case with beef.

It can take years to restore consumer confidence but experience on several markets has shown that it can be done. Domestic consumption of beef in the EU has returned to its long-term trend, although prices have not yet recovered, which suggests some shift in demand. Public funding is necessary because, when combined with efforts by the producer associations involved in the crisis, it provides greater credibility. Continuous efforts are required in the medium term as well as considerable communication skills adapted to each particular market. One of the problems is that, as a consequence of the crises, consumers can switch to other substitute products. This has happened with beef and other meats such as pigmeat, poultry meat, lamb, etc. A further outcome is that consumers decide not to buy a product because they refuse to eat it; many meat eaters have become vegetarians for this reason.

There are many challenges affecting food safety, such as pathogens, pesticide and drug residues, food additives, environmental toxins, persistent organic pollutants, and unconventional agents such as those associated with “mad cow disease” and zootomic diseases. There are more unknown than known food-borne pathogens causing illness, hospitalisation and even death. There have been many food crises, but bovine spongiform encephalopathy (BSE) or “mad cow disease”, which started in the UK, has probably given rise to more problems than the others. It was known since 1986, but the crisis exploded in 1996 when a link was established between human deaths and the disease, although there was uncertainty as to how the disease was transferred to humans.

Other examples of food scandals have been related to foot-and-mouth disease, dioxin and swine fever in the EU, and E. Coli and Listeria in the US. Three problems present continuing challenges: microbial pathogens, pesticide residues and mycotoxins. Salmonella is a striking example of microbial food safety risks and it has created severe market tensions especially in international trade, as some countries have required near-zero tolerance in poultry, for example. There are no standardised requirements for all countries and each member of the World Trade Organisation has the right to determine its own level of sanitary and phyto-sanitary protection. This compliance diversity makes trade more conflictive and, to complicate things further, some countries apply different rules depending on whether products come from their own country or

are imported. An increase in trade may increase food risks but, at the same time, it has been an important factor in the improvement of sanitary conditions in many countries, thus protecting consumers.

Consumers are now better informed about food crises than they used to be, but the first impact they experience is usually exaggerated news about an issue which subsequently proves to be less crucial. The first reaction is that the media seeks negative news which will have a major impact and increase media sales; and the consumption of food, which is a necessary daily exercise and a more sensitive issue than other human activities, suffers from that negative reaction. The news first disseminated tends to overemphasise problems due to the fact that no solution has yet been found and to the lack of precise information about the problems involved.

Whenever there is a drastic disruption on the market, supply and demand are affected and imbalances occur throughout the supply chain. Negotiating power among the various levels of the chain is critical for finding a new equilibrium. On those occasions, the distribution sector has a better chance of maintaining its position because it has the opportunity to obtain similar products from other origins. Primary producers are in the weakest position and are penalised hardest, both in terms of both low prices and lack of protection compared to other actors in the food supply chain and also as regards the uncertainties of the entire process.

Market crises reinforce collaboration amongst firms as well as innovation to deal with new challenges. Collaboration provides important risk-sharing benefits; for example, several large meat firms have preferred to share their innovation freely with the rest of the industry in order to protect and even to increase meat consumption. They feel that the entire food chain is in danger and the benefits of sharing progress are greater than the partial benefits linked to bigger sales of a single company. Large and small firms cope with the problems in different ways, since the former usually have more homogeneous products, whereas the latter do not have economies of scale and have to be more specialised in their approach. Large firms are more inclined to invest in process innovation in order to deal with food safety problems, and technological validation by third parties is very important.

## **Perceived risks**

Risk analysis is usually a three-stage process consisting of assessment, management and communication. Risk assessment depends on the factors taken into account to make the analysis and on the level of caution applied in the risk assessment process. Risk assessment is a scientifically-based approach consisting of the following steps: (1) hazard identification; (2) hazard characteristics; (3) exposure assessment; and (4) risk characterisation. The premises or principles that can be used in risk assessment can vary from strict quantitative analysis based on scientific knowledge to the application of the precautionary principle. The latter approach is adopted when there is difficulty

determining the risk scientifically – in the case of genetically modified organisms, for example – because of lack of knowledge, and it obliges countries to recommend that the precautionary principle be applied.

The precautionary principle states that policy makers should err on the side of protection in cases where there is significant scientific uncertainty or where the consequences of an error are significant. The precautionary principle could be used when scientific information is insufficient, inconclusive or uncertain and when there are indications that the possible effects on human, animal, or plant health may be potentially dangerous. This principle is a wise measure to take but it is very difficult to determine where the line is to be drawn between having sufficient knowledge and lacking it. Political decisions are intermingled in the process and determine the extent to which the process is applied.

Food crises have negatively affected consumers' perception of processed food. According to consumer surveys, the more processed a product is, the greater the danger of causing health problems and being considered less safe. This shows that consumers have serious fears about technical processes and their control. The inclusion of new technologies and food production methods add uncertainties and risks. Typical bulk commodities, on the other hand, are widely considered to be very safe, yet in many cases the production means involved do not meet the health standards required in most modern food production processes. However, the use and abuse of certain substances for preserving products have created doubts about modern processes due to the fact that they are not sufficiently tested before their use is authorised.

Consumers are sensitive to many risks involved with food, in particular with novel technical processes which have numerous human, environmental and ethical consequences. Various parties are involved on the human side. Farmers are exposed to dangers when they work with chemicals, although there are norms for minimizing exposure and its consequences. The same applies to workers throughout the various processing stages, particularly in the case of certain hazardous jobs, which in many rich countries are often performed by immigrants. Consumers may not react negatively immediately, but it has been proven that some substances promote various cancers. The difficulty lies in determining the amount of such substances which food products may contain and the frequency of consumption required in order to produce negative effects.

Environmental issues are now attracting more attention amongst consumers and citizens. It is not the product itself which attracts the attention but its relationship with the environment and the damage that its production process might create as well as the waste created once it has been consumed. This sensitivity varies from one European country to another as does the price that consumers are willing to pay for products which respect the environment. The richer a country is and the higher the level of environmental education, the more consumers are willing to accept high prices for this kind of product. It has become a sales argument to supply food products on the market which have a distinctive attribute providing value, such as having been organically grown.



Young consumers, usually in wealthy countries, and educated consumers are more concerned about environmental issues than the rest of the population.

Ethical issues and consumer considerations have moved from farmers in rich countries to poor farmers in developing economies and the technology they use. Consumers consider that fair trade should be more concerned with those poor farmers. On the other hand, the introduction of new technologies is essential for increasing productivity. It is curious to note that some consumers regard the traditional processes used in poor countries without technology as a better means of obtaining less risky food products. This is the consequence of poor communication about technological processes and idyllic ideas of tradition, in both developed and developing countries. Traditional food products generally contain natural ingredients but are sometimes processed by unsanitary means. On the other hand, the technologies used in wealthy countries need to be carefully analysed and tested in order to ensure that there are no harmful consequences. These factors should be analysed case by case, and technical controls are the best means of minimising problems, which should be communicated to consumers.

A distinction can be made between two types of perception depending on whether formed before or after a food crisis. The risks consumers perceive as being linked to any food before it is eaten can be real or their perception can be out of proportion to the reality of the situation. Studies have been conducted with a view to better ascertaining consumers' perceptions of the major dangers related to food, and the results have been checked against the existing expert information. The two visions can be quite different with respect to food problems, the origin of the crises and the severity of the consequences. It is interesting to note that the food problems which cause the greatest number of illnesses in the population are not perceived as being the most dangerous, whereas individual crises have attracted great attention. It is also common for consumers to perceive greater risks and a greater number of risks than does the food processing industry.

Brands are necessary references for consumers. Outside the food sector, they are almost imperative commercial tools for any firm, but the food sector has lagged behind in the use of these tools, and many fresh products have been sold without any brand name. This has not been the case with non-perishable products, since almost all of them have brands, although many have a restricted impact as they are sold in limited areas. Prior to the food crises it was common, for instance, for many types of meat to be classified by their physical characteristics and organoleptic quality. A consequence of the food crises has been that brands are now more frequently found on the market because risk perceptions engender negative feelings about commodities and food products without brands. Consumers feel safer with brands than without them, and this trend should encourage the food system to work more in that direction.

Another effect of the crisis has been the amount of information provided to consumers and the way it is transmitted to them in order to minimise their risk perceptions. Consumers are demanding more information about foods and their health risks even though they subsequently may not use the information. The idea is to communicate to

consumers the benefits of a healthy diet and the safety implementations involved throughout the agro-food system. Consumers frequently demand information but then do not use it extensively. It is as though they feel better when they know that the information is available and improving their safety, although they do not know exactly what the consequences or implications are. Consumers with health problems are more in favour of increasing the amount of information supplied as is the case with those who are more health-conscious.

One of the outcomes of the food crises has been that consumers do not understand why, in general, scientific and technical experts have been unable to control and avoid the problems that have occurred on the market. As a result of these crises people have become less trusting of science than was previously the case. On the other hand, some famous scientists play an important role in communicating and restoring credibility amongst consumers. This does not mean, however, that there were never any food scares until the present day, but nowadays they are more immediately exposed and better known, although sometimes amplified. Several works show that consumer perceptions of food crises do not correspond with reality and that consumer knowledge of the most dangerous effects is vague.

Market crises have had an impact on the origin of the food concerned – a particular country or area. Consumers have discriminated positive perceptions of certain origins. In general, food crises have strengthened the use of product origin labelling as well as the use of other complementary information with a view to minimising risk perception. Since consumers require information but are unable to understand it because it is generally complex, they rely on opinion leaders. The opinions provided by consumer associations, doctors, nutritionists and sports stars are references for healthy food. However, their comments are sometimes used only for advertisements rather than for clear health-related purposes.

In normal situations, trust has a marginal impact on the consumer's intention to purchase; other buying attitudes appear to be the most relevant determinants. However, this reaction changes when consumers encounter special situations such as food crises and trust then becomes an important component. It is as though trust is stressed when uncertainties occur and normal patterns are followed in other situations. However, trust relies on other elements, which can be constructed in the event of critical situations, since it is very difficult to suddenly change human perceptions and risk assessment. These changes in human behaviour should encourage companies and public institutions to be aware of the need to create environments conducive to trust.

## Food safety decisions

Food safety decisions are related to risk assessment. Risk management refers to the way methods are applied in order to minimise the potential hazards identified in scientific risk assessment. Risk communication is the exchange of information to the public on

risk assessment and on risk management decisions. Decisions on risk management and communication strategies vary widely from one country to another, and this results in different regulatory schemes and approval procedures. Decisions depend on: (1) whether the level of risk is considered acceptable; (2) the various interpretations of the relevant concepts; (3) the various ethical and social concerns of citizens; and (4) the various consumer reactions and acceptability in general.

Regulatory agencies worldwide are increasingly adopting the Hazard Analysis and Critical Control Points system to control microbial pathogens in food. In some countries this practice is compulsory and in others the food industry is well aware that it is virtually a business requirement. Many certification schemes have introduced such a practice in their recommendations as a good decision aiming to minimise food risks and improve overall business and enhance product quality.

When a problem occurs it is crucial to know how to react, both in terms of measures to be taken but also in terms of timing. There have been many examples where a crisis has been amplified after the outbreak either because the appropriate methods for tackling the problem were not applied or due to unfortunate statements made by political authorities or poor handling of the news. Thus, the decisions taken immediately after a crisis are crucial in order to prevent the circulation of news with subsequent damage that is difficult to control. There are two decisions of primary importance: the first is to locate the problem and the extent of the damage – and this is followed by immediate subsidiary decisions –, and the second is to make a good communication proposal. For example, in the case of the BSE crisis in the UK the government took a series of measures to prevent infected animals from entering the agro-food system through slaughterhouses and the downstream supply chain but communication on the issue was poorly handled.

The days immediately following a food crisis seem to be crucial for limiting the extent of the negative effects. Food multinationals usually react within a shorter time span, because they are afraid that the entire image of the company or, in particular, the brand related to the product involved, might be damaged. They usually spend large amounts of money on informing consumers via the mass media in an effort to convince them that the problems are under control, to minimise those problems and to communicate all of the measures undertaken to prevent new defects.

Food chains are becoming complex and actors in the chain are becoming more and more closely interrelated. Chain captains exert considerable influence on food safety decisions, not only prior to any food crisis but also when a food scandal reaches the media. In the food chain system the main distributors send messages to the rest of the chain. The same happens with large restaurant chains mainly connected with fast-food restaurants. In both cases they have their own brands to defend – food products in the distribution chains, and the names of restaurants in the second instance. Aware of the risks involved if the markets collapse, they are the first businesses concerned with preventing food fears and they require their providers to comply with strict rules.

## Traceability

In several food crises the response was not immediate because the exact cause of the problem was not really known. The negative consequences were thus more conspicuous than was warranted by the actual dimension of the problem. This repetitive scenario necessitated a new approach to the agro-food chain as a whole. More detailed information on the entire production process and product traceability from producers to consumers was necessary as a means of monitoring any problems that might exist. Such problems have had an impact on product evaluation and have brought a change in approach from one where attention focused on the product itself to the more recent approach which embraces the entire production system.

Voluntary and compulsory traceability schemes have been established so that all agro-food firms now say that they have some sort of active traceability system. The trouble is that traceability methods vary widely as does the stringency with which they are employed. A good system requires massive handling of information so it has to be fully computerised. One of the greatest difficulties is passing information from one production stage to the next. Bar codes have been essential for information transmission together with electronic reading equipment and extensive computer use. Special software has been created by many companies due to the large number of businesses requiring such systems.

It is quite possible, although difficult, to have good traceability systems in food industries providing information on each individual process and product, but when inputs come from various origins traceability is more difficult to accomplish. The greatest difficulties occur at vertical linkages, where identification is not usually performed for a particular item but for a bundle or lot. In the case of processing plants producing meat products it is common for animals from a particular farm or animals which have been slaughtered on a particular day to be located. If a problem arises the traceability system can locate those animals, but it is not very precise. The next step is to know exactly where the problem is and to locate the factors which have caused the processing fault.

Thus, at farm level, instead of having individual information about each animal it is common to have information on bundles or lots. This is the reason why, for example, instead of talking about individual animal traceability, traceability generally tends to concern a group of animals. One of the most important reasons is that producers are more independent and have small enterprises, with the result that information is incomplete and insufficient for following up the process to the full. These difficulties are gradually being resolved with the implementation of more sophisticated systems by producers with which, for example, each animal and the ingredients used in the animal feed can be traced.

It is not so difficult to trace products at the distribution level, the system being similar to those used in food-processing firms. The distribution systems are concentrated to a large extent, and big companies have good computer equipment for tracing products as a way to reduce costs, either in logistics activities or in storage facilities.

In some shops the possibility has been introduced for consumers to check products and to find out their entire history. This is a novelty which is highly appreciated by consumers, although it is not widely used – probably because consumers lack time and due to the technical difficulties involved in implementing such systems.

The information can also be consulted on the Internet, where consumers can access not only the literature about the process but also pictures of the different stages of production. In the final analysis, the idea is that consumers should be aware that technical processes are more under control. This does not mean, however, that it is only with traceability systems that improvements will be achieved and quality will be better or a higher level of safety will be ensured. We can have production processes with or without traceability systems, but the use of such systems certainly helps to improve safety controls.

Agro-food companies have been anxious to adopt traceability as a means of differentiating their products from those of their competitors, a feature which is generally appreciated in the US, whereas in the EU traceability is generally valued as a risk management tool. Large distribution chains have been requiring their suppliers to incorporate traceability systems. This adds to costs, but if all companies have to abide by the same rules the terms of competition are ultimately the same for all. Nowadays, when many companies have already incorporated good traceability systems, the problem is for companies which have avoided doing so, since they face market competition with a certain disadvantage. After all, consumers expect all companies to integrate traceability systems into their production processes and they expect food products to be safer than those involved in the past major food crises. This could lead to discrimination against companies and products which have no traceability systems.

A few years ago, many consumers had never heard of the term ‘traceability’. It is still not a very popular word but it is becoming more familiar, since it is now being used more regularly in the media. It is strange to note that now that the word is being used more often people rarely know what it means exactly, unless they are professionals involved in the agro-food system. In view of their worries, consumers seem to need to seek references which add safety connotations, even though they may not fully understand exactly what they mean. This is another reason why they rely on opinion leaders, who are able to understand the problems and to communicate appropriate messages. Traceability has become a catchword for consumer safety concerns, and companies have consequently been forced to incorporate the system into their production processes. Companies themselves have no incentive to create traceability systems for tracking food once it has been sold and consumed, and they believe that public institutions should take care of this.

Traceability systems coexist with food control systems along the food chain. Both incur food supply costs, which have to be evaluated and compared with the benefits. Traceability systems involve higher costs because there are many compulsory controls, while control systems are more open to a variety of schemes. In many cases controls are carried out by third-party companies and insurance can be an integral part of food safety control systems. Businesses adopt voluntary systems based on internal business-driven

decisions or external customer or regulation-driven schemes. The most comprehensive traceability systems have included more sophisticated characteristics such as products which comply with fair trade practices and wages. These characteristics try to reinforce credence attributes and product differentiation. In order to be successful, traceability needs to be accompanied with other management, marketing and safety control activities.

## Genetically modified organisms

Genetically modified organisms (GMOs) is the term commonly used to refer to crop plants created by means of molecular biology techniques directed at transgenic modifications of food crops; they are a special case when considering food safety. Transgenic evolution takes place in all species following natural paths, but GMOs are introduced by humans to achieve the same or different objectives. If the same objectives are proposed, the speed of change is usually much higher while possibilities with new objectives are opened up.

Several of the benefits and disadvantages of using GMOs should be mentioned here. The potential benefits could include higher agricultural yields and the possibility of increasing food availability, reducing pesticide requirements, etc.; some benefits could be related to curative health and others to preventing diseases in crop fields or humans. The greatest economic benefits would probably go to companies which carry out research in these fields – and this research is concentrated in a small number of companies. The potential risks could include long-term effects on human health, long-term environmental problems, loss of biological diversity, too much power in the hands of a small number of companies, etc. There are many dangers which are not really well known and medium to long-term consequences are currently being analysed in many research centres.

Like any other fundamental scientific breakthrough, genetic modification creates special situations, as there are good and bad connotations depending on how it is used. It also introduces new uncertainties and the possibility of unknown side-effects. The application of biotechnology to produce GMOs for food products has attracted more discussions on food products than on applications in other activities such as the pharmaceutical and textile sectors, the main reason being that food consumption affects human health more directly and has to be contended with daily. Genetic modification has generated great controversy amongst citizens, especially in Europe, where it is viewed very differently compared to the United States. Other countries in the world have also adopted stances in favour of or against GMOs, and powerful agricultural producers such as Brazil and Argentina already have many hectares planted with crops that include genetically modified organisms. In Europe, there are several countries, such as Spain, where the use of GMOs for crops that form a substantial part of animal feeds has steadily increased in the last few years. However, their use in food products for human consumption is very limited in view of compliance with EU rules and of market sensitivity to these issues.

Consumers believe that there are risks related to human health and the environment; on the other hand, there are also benefits, which must be evaluated as trade-offs. As a result, they make decisions as to whether or not to consume food products with GMO ingredients, but usually with a limited amount of information. In some cases the information provided is more extensive than in others, depending on the existing rules on food labelling. Various rules include a minimum content to be written on labels, so there is information which has to be assessed by consumers. There are two different approaches in this respect: in Europe there is a tendency to include obligatory labelling with enough information to allow the consumer to judge, while in the United States the attitude is that most of the information should be voluntary. The reason for this is that compulsory labelling is expensive and it is argued that food product prices will be unnecessarily inflated.

This complex problem regarding GMOs has been analysed from various perspectives such as consumers' attitudes and perceptions, product information and the role of trust in information sources. It has been broached through consumer surveys including questionnaires asking consumers to state their preferences in an effort to establish the positive and negative aspects which might affect consumers' buying decisions. Results can be checked by comparison with revealed preferences, which are analysed through consumer data recorded at supermarket check-outs. A further method is to use experimental economics, where various assumptions are checked and the willingness to pay is estimated. Interactions amongst different variables provide a basis for evaluating trade-offs, and each methodology has advantages and disadvantages.

Empirical results obtained from surveys indicate that consumers' reactions are heterogeneous and that it is difficult, if not impossible, to consider the average consumer. Some consumers are concerned about agricultural raw materials, others about food ingredients, and others direct their attention to finished food products. Other groups are curious to know more, but they do not have any definite perception of these food products. More information about actual buying behaviour is necessary, but the current EU rules prevent this kind of analysis, since it is not possible to have food products with labels indicating that they contain GMOs which could be partially compensated with auction-based experimental data.

The GMO issue has attracted considerable attention in society and is probably a good case study for analysing all of the factors affecting consumer reactions as well as institutional arrangements, political decisions, power imbalances in the supply chain and the real state of the art or science in the face of this novel product. Final decisions are probably a combination of all of these factors, and it seems that, little by little, more products in Europe and other geographic areas are incorporating GMOs and the institutions are allowing them to be sold on the markets. A further consideration is that companies which are developing GMO products have effected considerable investments, which need to be recovered through product sales. The approach adopted in the EU, in comparison to the US, could be an impediment for EU companies in competition with other businesses, and some of them have moved to the other side of the Atlantic.



Traceability and labelling have been regulated in the EU by Regulations 1829/2003 and 1830/2003 on genetically modified food. Those Regulations aim to harmonise rules amongst all EU countries. The European regulations on labelling require the use of positive statements on labels. Every genetically modified substance used in a processed food has to be identified with precise identifiers. There are two aims behind these policies: the first is to promote the implementation of risk management measures, and the second is to ensure that accurate information is available to operators and consumers so that they can make an informed product choice.

## National and international regulations

Food fears have encouraged new institutional arrangements in many European countries and at the EU level. Many agencies, both national and European, have adopted the term 'food safety' in their denomination, such as the European Food Safety Agency. Both governments and the newly created agencies have established assurance programmes to improve food safety. They are usually more concerned about technical issues than communication policies but have played an important role for consumers in ensuring that their governments are aware of food fears and also in efforts to improve consumer diets with healthy food products.

There are significant differences in approach with regard to the institutional arrangements undertaken in the US and the EU. In the US, food safety is regulated by state and federal laws through the existing institutions, which also deal with other food issues. The regulations they issue tend to be based more on final products rather than processes, which are more the focus in the EU. In the EU, the Food Safety Agency creates special regulations for all EU member states, although some additional regulations may be issued in each country. There has been frequent controversy, not only between countries but also amongst the different EU institutions.

Governmental institutions can act in many different ways; the main measures include stepping up controls on safety information, increasing the cost of food safety failures and the benefits of innovation successes in dealing with food safety problems, providing flexibility in the choice of food safety technology, investing in the science infrastructure, and supporting research on safety testing. Another area of interest is action to increase the means of avoiding asymmetric information for consumers and for firms supplying inputs to agro-food enterprises. With better information, food safety, which can be regarded as a credence attribute, can be converted into a search attribute due to the information consumers can read on labels or when investigating other information sources before purchasing food products, i.e. better informed consumers will be able to look for food products with the appropriate information.

Public institutions lay down obligatory rules, but private firms take account of their own voluntary rules. Government regulations include ex ante direct regulations and ex post product liability laws. Voluntary actions are usually linked to norms set by third



parties. A combination of both needs to be elaborated, and the costs and benefits of implementing both should also be taken into consideration when the optimum level of efficiency is being established. The most common justification of public involvement in food safety is market failure, and voluntary schemes seem to be handled more efficiently.

Joint efforts or co-regulation between the public and the private sectors can lead to more efficient and effective treatment of food safety objectives. Co-regulation lies between the extremes of no intervention at all and total command and control. Self-regulation is implemented by individual businesses when there is no public intervention, and it has been more common in the US. Information and education policies are typical approaches of many European governments but would not seem to suffice, since the level of food-borne disease remains persistently higher than the level registered a few years ago.

Food safety regulatory standards can be differentiated into process, performance and combined standards. Performance standards can be described as controls that regulate the upper limit or maximum tolerance level of risk in food. Process standards require the firm to use at least a minimal amount of risk control input. Most regulations combine elements of both, and it is the public institutions that are responsible for laying them down.

## Consumer concerns

Consumer concerns about food safety are related to the attitudes they have to safety in general. Those general attitudes are of great significance in distinguishing consumer groups and they can be related not only to food but also to variables related to environment, lifestyle and food risks. Farms and food businesses usually have better information about the safety of the products they produce than their customers or consumers; there is thus information asymmetry, which must be corrected.

Although food safety tends to be more related to food scandals, some consumers attach greater importance to other more normal daily concerns affecting their lives. These might concern the hygiene and cleanliness of the shop, for example, or the freshness of the product, the way a product is presented or the lack of information. They are the result of characteristics which consumers can check rather than simply believing in credence attributes that they cannot control. These safety concerns may have implications for the products they buy or the places where they go shopping. These perspectives are not usually considered but they can have greater regular impact than other better-known food scandals. This approach also provides a different viewpoint because the main food fears are not in the hands of consumers, who hope that professionals and public institutions will solve these problems. However, consumers have command over their daily decisions and they react in their own way to safety concerns.

Communication should be related to trust perception, and consumers can be classified according to their response to food risks. Those who have less trust in food safety information tend to be less sensitive to risk perception and rely more on their social

network. Those who are most inclined to trust information from any source are the most sensitive to changing their risk perception levels. The impact of food safety information depends on the communication source and its reliability.

To facilitate understanding of consumer concerns about food safety communication means, it is important to collect information from the same sources that analyse consumer reactions with regard to other technical matters relating to food. Thus, television generally comes first followed by food labels and technical magazines. More dedicated consumers try to obtain information through professional magazines while average consumers use the other means. Radio broadcasting offers good cost/benefit ratios, and although it does not have as great an impact as television, it is a persuasive communication means.

Once problems have been solved or at least located, advertising campaigns are necessary in order to restore market credibility. Producers tend to use generic advertising campaigns in order to promote positive food elements and allay any consumer anxiety about unsafe food. These campaigns have direct effects on the food products advertised and cross-effects on rival food products. For example, it has been found that chicken advertising campaigns reinforcing safety issues about this product have had negative effects on pork consumption.

Rules should be adapted to consumer concerns but also to real risks. Thus, consumer concerns rank as follows: fats and cholesterol, microbial food poisoning, pesticide residues, preservatives and additives, fat content, hormones and antibiotics and sugar content. They think that food services are the main source of food-borne disease outbreaks. Food safety concerns affect consumers differently depending on their traditional characteristics such as age or income but also on other newly considered variables such as lifestyles, individual or collective orientation, social commitment, materialistic or non-materialistic orientation.

## International competition, a security asset?

Food safety has attracted considerable consumer attention in the last few years. It has also been of great concern to public institutions as well as to food chain actors. Agro-food systems have gradually improved the safety of their processes and thus of their products. However, it is extremely difficult to achieve zero-risk agro-food processes because the cost is too high and above certain risk levels profit margins are too small. All in all, consumers feel more protected and are aware that authorities are taking care of their interests – with certain limitations due to scientific and technical shortcomings. But food safety has improved in real terms and also in people's minds. In this respect, it would be important in the future to know to what extent social settings affect perceptions and how to deal with food crises in different countries and situations.

Whenever food crises have occurred, the institutions have reacted with measures to protect consumers and to restore public confidence in their role. They have achieved

their aims to a large degree, although there are many aspects which have not yet been accomplished. In the future, we may also see greater involvement on the part of large firms – both distributors and agro-food companies as well as food services; the latter could be mainly through fast-food restaurant chains. One consistent factor observed is that all those groups of companies have powerful brands on the market. They cannot afford to make mistakes which could damage consumers' credibility in their brands, since these are probably their most important assets. As a result, they establish their own rules and control systems. The risk of failure is too great, and it is very much in their interests to prevent food fears.

The scenario may be quite different in the future, when safety may almost be taken for granted and may not necessarily be a plus for any food product, since consumers expect to have safe products. Furthermore, traceability will be implemented in almost every process, and producers who are unable to implement control and communication systems will be out of business. This is already happening to some extent because the big distribution chains are obliging suppliers and also producers which provide their own distribution brands to follow strict rules. This does not prevent problems but it at least paves the way for reacting more promptly than has been the case hitherto.

Furthermore, other product characteristics will attract greater attention. However, countries or food chains which are unable to have effective systems will not be competitive internationally or their products will be low-priced and will face the threat of being replaced by products from other origins. The same applies as regards the difference between commodities and finished products. In this case, unsafe food products could be regarded as commodities that are easy to replace, while safe products will have certain distinguishable characteristics.

Food safety can be one of the hottest issues in international trade due to the lack of harmonisation rules. Even in the European Union it is difficult to make common decisions and there are particularities in several countries. Part of the problem stems from the use of different norms and standards. The first step should be to reach agreement on the rules and then to define a compromise to control levels of stringency. Countries with developing economies may react aggressively considering that food safety is a non-tariff barrier to trade, so clear rules must be laid down in international trade negotiations.

More preventive measures will be in place in order to avoid risks, but communication will probably be tremendously improved, because the history of the different crises shows that the statements made in the news do not correspond with the real consequences of the food crises. A further factor is that food is a sensitive issue which affects everyone's daily activities, so any news can be amplified, whether justifiably or not. This also means that big firms should have specialists who are aware of these aspects in order to react properly to protect their business and brands.

More positive communication should be implemented, since negative news has great impact. This requires a dynamic attitude creating and publishing positive news about

food and avoiding bad news or, at least, explaining clearly any food problem which might arise. The entire process will be better understood with more education and public policies enhancing consumers' knowledge of food and diets as well as their health consequences. After that, it is a matter of combining private business-related activities and public policies at both the international and the national level.

Government policies should include programmes which encourage better consumer information and education. Information can be transferred through many different channels, but consumers are rarely aware and rely on professionals to keep abreast with and interpret technical information. However, they devote greater attention to labels, although they spend very little time reading them. Easy formulas should thus be used for interpreting the information rather than providing long statements or complex knowledge that is difficult to interpret.

For example, instead of written information, packages should include new ways of interpreting food safety by means of colours on special parts of the packages or stickers showing different levels of safety controls. This may be more difficult in the case of perishable products, and meat products in particular seem to be of great concern to governments. Indications of storage temperature and of the time limit for consuming the product should be reinforced. Consumers should also be given information about traceability schedules – for example, the date on which the raw material was harvested or the animal was slaughtered.

The transmission of a large quantity of data has been crucial to improving traceability systems, and bar codes have been essential for passing on the information. This system may become obsolete in the future if radio frequency identification is used, which will be able to handle information more accurately. It has already been implemented for logistic purposes, although it creates some concern amongst consumer associations, because products can be followed after being checked out through supermarket cashiers if the systems are not deactivated.

More complex issues can be dealt with such as pathogen performance information. Government-certified labels for low-risk foods, the protection of intellectual property rights, and measures to encourage collaboration amongst firms and to help to establish testing norms when standards are technically difficult to verify are several good examples of future rules and government involvement in the efforts to deal with safety concerns. Rules relating to trade will require efforts from countries, both individually and jointly, in forums connected with health and economic issues.

Food safety levels will need to be quantified in different systems and new indices will have to be defined in order to do so with appropriate variables that are easy to find for many food products and processes. This approach will add objective measurements, although consumer education will be the greatest challenge in any country, since consumer decisions must be based on sound reasons and independent knowledge. The new approaches will not prevent food products from incorporating more credence charac-

teristics relating to food safety, but with better consumer education many of these characteristics should be converted into search attributes and food recognition attributes.

Future trends will tend to take account of medium-term considerations because they are based on previous knowledge. One example is the role that food irradiation can play in the future. However, unexpected future events will introduce new dimensions that will require new approaches and policies. Both the public and private sectors must act together in a difficult compromise between protecting consumers and trying to build efficient and safe agro-food supply chains. International competition will be fierce and food safety will increase due to country-wide adaptations to new requirements, although this may create conflicts which will be solved through international institutions. The ultimate aim is to have safer systems worldwide and consumers who can live longer and with a better quality of life.



# FOOD QUALITY IN EUROPE

*Ana I. Sanjuan*

## European food quality policy

### Motivation and objectives

In the 21st century, European consumers are showing ever-increasing concern about health and dietary issues, and this in turn is reflected in the demand for safe and quality food products. The outbreak of a series of food crises in the 1990s (e.g. BSE, dioxin feed poisoning, adulterated olive oil) heightened the profile of food safety, forcing EU authorities to respond by updating the regulations into the General Food Law Regulation. The principal contribution of this regulation has been to impose more stringent rules and standards on the safety of food and animal feed. Secondly, it has introduced traceability, i.e. the ability to trace any foodstuff from its original components along the food supply chain up to the final product offered to the consumer; and finally, more informative food product labels are now required in order to provide accurate information to consumers regarding composition, traceability, GMO presence, and beneficial health claims. These are general and broad rules applicable to any food product traded in the EU, either domestic or imported.

In recent years, there has been increasing social concern about the use of Genetically Modified Organisms (GMOs) in food. Public opinion has recognised that together with the potential benefits there are also potential risks for humans, other living organisms and the environment, although the extent of those risks are yet unknown. In response to the increasing public concern, some large European supermarket chains (e.g. Marks & Spencer) have refused to sell any food product which contains GMOs, and European policy has moved towards compulsory labelling and traceability.

The legislation on the traceability and labelling of genetically modified organisms (GMOs) was harmonised, amended and enlarged by Regulation EC 1830/2003. According to the new regulation, food and feed containing any GMO component or ingredient must be labelled accordingly, and throughout the food chain. The current legislation covers all food – and feeding – stuffs produced from GMOs, without making any distinction between those containing DNA or genetic modifications in the chromosomes and those containing proteins derived from GMOs (europa.eu.int/scadplus/leg). Traces of GMOs that do not exceed the 0.9% threshold and are considered as inevitable

contamination are exempt from labelling. The label bearing the words “this product contains genetically modified organisms” or “this product is produced from GM (name of organism)” must be attached to each retail unit. Where this is not possible, the operator must ensure that this information is transmitted with the product along the supply chain. The tasks of GMO authorisation and identification are carried out by the European Food Security Agency in compliance with Regulation EC 1829/2003 on the approval and commercialisation of genetically modified food and feed.

Consumer concern and willingness to pay to avoid GMOs has been the subject of several scientific research papers, which have focused on a broad spectrum of food products and countries. Some applications with European consumers are Lusk *et al.* (2003) for beef meat in several European countries and the United States; Burton *et al.* (2001) for generic food in the United Kingdom, and a summary of recent literature on the topic can be found in Lusk *et al.* (2005) together with a meta-analysis providing a basis for combining estimations on 57 different valuations for GM-free food.

In addition, consumers demand not only safe food but also quality and diversity. In this context, EU policy has focused on local specialities, i.e. food products whose quality or reputation is linked to the specific region or area where they are produced or to the specific raw materials or technical processes developed within a limited geographical area. In European Mediterranean countries such as France and Spain, the protection of origin as a means of identifying a food product dates back to the beginning of the 20<sup>th</sup> century and was first introduced in the wine sector, which was more exposed to international trade flows and possible imitations. In the 1970s national legislation in those countries was extended to include other agro-food products. In 1992 and 1999, the European Commission provided a common legislative framework for defining and registering protected denominations for agro-food products and wines, applicable to all members of the European Union. This new legislation inherited definitions, requirements and procedures from national legislations, thus providing a cross-country common reference. The EU legislative bodies defined the term Protected Designation of Origin (PDO), in close correspondence to the French ‘Appellation d’Origine Contrôlée’ (AOC) or the Spanish ‘Denominación de Origen’.

From the earliest examples of designated-origin labelled products, the main goal has been to communicate the true origin of the product as a means of avoiding unfair competition, misuse and imitations. The latter not only discourage producers, but can also lead consumers to believe that they are buying an “authentic” product, whereas this is not in fact the case, and thus lead to a form of post-purchase dissonance. A further benefit of these origin labels is that they enable farmers and producers to continue to make a living in their own regions by finding a marketplace for their high-quality reputable foods and receiving a price premium in exchange for quality and authenticity. The strong linkage between product and territory makes traceability a mandatory issue; closer vertical relationships thus arise along the supply chain, promoting the redistribution of value added across economic agents.



Not only does the importance of this type of production provide producers – who in many cases operate on a small scale – with an important component of added value, but, perhaps more importantly, there are positive externalities for the development of rural areas – prevention of an exodus of the rural population, use of the land, conservation of the countryside, plus the intangible benefit of preserving traditions and culture. By promoting regional specialities, the region is also promoted, and this in turn can promote local tourism. Likewise, the protection of regional food products contributes to the diversification of agricultural output, orienting farmers from producing commodities in large quantities towards producing differentiated foodstuffs of high quality. Importantly, from a policy point of view, these self-reinforcing interdependent relationships help to reduce dependency on Common Agricultural Policy (CAP) subsidies, thereby conforming with the sustainable development objectives of the EU (i.e. differentiated and competitive production).

## Legal definitions

Two Regulations were adopted in 1992 by the European Community, namely Regulation (EEC) 2081/92 on the protection of geographical indications and designations of origin for agricultural products and foodstuffs, and Regulation (EEC) 2082/92 on certificates of specific character for agricultural products and foodstuffs. While the former deals with the protection of names, the latter protects traditional recipes. Both regulations have recently been updated by Regulations (EEC) 510/2006 and 509/2006 respectively.

Regulation EEC 2082/92 distinguishes between two categories of protected names: Protected Designation of Origin and Protected Geographical Indication. The Protected Designation of Origin (PDO) is defined as “the name of a region, a specific place or a country (in exceptional cases) used to describe an agro-food product originating in that place, whose quality or characteristics are essentially or exclusively due to the particular geographical environment of the place of origin, which includes inherent natural and human factors, such as climate, soil, local know-how etc., and all stages of production, processing and preparation must take place in the area whose name is attached to the product”. For example, in the cheese industry, household names such as ‘Roquefort’ in France, ‘Parmigiano Reggiano’ in Italy and ‘Queso Manchego’ in Spain are all Protected Designations of Origin.

The Protected Geographical Indication (PGI) is the name of a region, a specific place or a country (in exceptional cases) used “to describe an agro-food product originating in that place, which possesses a specific quality, reputation or other characteristics attributable to that geographical origin and at least one stage of either production or processing or preparation takes place in the defined geographical area”. The PDO thus requires a stronger link between the product and the geographical area, whilst the PGI may simply require that the product owes its reputation to its geographical origin. Examples of PGI in the meat sector are ‘Jambon de Bayonne’ in France, ‘Ternera Gallega’ in Spain and ‘Scotch Beef’ in the United Kingdom.

Under Regulation (EEC) 2082/92 a foodstuff can be registered as a Traditional Speciality Guaranteed (TSG) if it possesses specific and traditional characteristics that distinguish it from other similar products, either because it uses traditional raw materials or is characterised by a traditional composition or mode of production and/or processing. The name itself will express this specific character, being traditional or established by custom. The TSG label is not used as extensively as the PDO/PGI label. Some examples are 'Jamón Serrano' in Spain (cured ham) and 'Mozzarella' in Italy (cheese).

The remit of these two regulations on PDO/PGI and TSG covers all agricultural products and foodstuffs intended for human consumption as food<sup>1</sup> or as a beverage (excluding wine which, has its own specific regulation, and mineral waters, excluded since 2003 and subject to a specific directive<sup>2</sup>) and some non-food products, which constitute main sources of income for farmers and where the link with the geographical area is well established (e.g. ornamental plants, flowers, cork, wool, essential oils, etc.).

EU regulations establish a common symbol across the EU to designate PDO, PGI and TSG in order to attach credibility to the registered products, provide consumers with a genuine guarantee of origin and help producers to increase awareness of their products (see Figure 1). However, the use of these logos on the labels attached to registered products is not compulsory.

**Figure 1** - EU logos for identifying PDO, PGI and TSG



The attachment of geographical names to wines is governed at the pan-European level by a specific regulation that dates back to 1999 (EC 1493/1999) and concerns the common market of wine, which devotes a chapter to quality wines produced in specified regions (q.w.p.s.r.). This chapter was subsequently modified and extended by EC 1607/2000. Moreover, each country provides its own regulation to establish general definitions and requirements. In Spain, for instance, a new law on wine and vines has recently been approved (*Ley 24/2003*), in which different categories of wine are defined according to the requirements imposed with respect to linkage with geographical area and quality specifications. In addition, the Inspection Body for each q.w.p.s.r. defines very detailed requirements for a each wine to be eligible for origin label certification (e.g. grape varieties, maximum grape yields per hectare, technological issues in growing and harvesting grapes and in the wine elaboration process,

1 - The regulation excludes products derived from tobacco plants, for instance.

2 - Council Directive 80/777/EEC of 15 July 1980 on the approximation of the laws of the Member States relating to the exploitation and marketing of natural mineral waters.

etc.). Such guidelines in the case of wine are consistent with those applying to other food products registered through EC 2081/92 for Protected Designation of Origin or EC 2083/92 for Traditional Speciality Guaranteed.

However, there are several other quality labels in Europe, which are ruled and protected at the national or even regional level and which may be linked to varying degrees to the geographical area or specific quality standards. In some cases, these labels are certification marks, i.e. collective marks that groups of producers can use provided they comply with a set of common requirements (e.g. place of origin, raw materials, production methods). Under these regulations, small-scale operators in various sectors can consolidate their resources in order to gain global recognition for their products where the certification label guarantees superior quality and specific (traditional) processes. Some examples of certification marks on agro-food products are 'Label Rouge' and 'Certification de Conformité de Produit' in France; and 'C de Calidad Alimentaria' in the region of Aragón, Spain.

### Registration procedure<sup>3</sup>

Registration of a name as a PDO, PGI, TSG and quality wine produced in a specified region is normally the outcome of a private voluntary initiative on the part of the producers concerned, although these producers may also be motivated by the support or initiatives of local/regional public administrations. A group of farmers, producers and/or processors dealing with the same product (consumers may also be involved) needs to prepare the application, which must include: (1) the name (geographical or traditional, the latter originating exclusively from a specific area); (2) a detailed description of the physical, chemical, microbiological, biological and organoleptic characteristics of the product in order to highlight its objective specificity; (3) a description of how the product should be presented to preserve its identity (e.g. sliced, grated) and at which stage of preparation (e.g. fresh, processed); (4) the limits of the geographical area eligible for producing the food product; (5) measures taken to ensure traceability of the product to its origin (e.g. the keeping of registers by farmers, plots of land and processors eligible; controls at different stages of production); (6) a detailed explanation of the production method. Most importantly (7), the application must be able to demonstrate the link between the product and the territory, emphasising to what extent the natural and human environment conditions the shape the final characteristics and quality of the product. This latter criterion may be supported by the use of historical documents to emphasise the traditional link between the product and its territory. Finally (8), an inspection body (private or public) must be designated to control the conformity of products with the specific characteristics required and to carry out the certification labelling. The inspection body becomes an essential actor in the functioning of the PDO/PGI supply chain, enhancing network activities – e.g. making proposals for

---

3 - The general registration procedure can be consulted in European Commission (2004a).

modifying the product specifications or proposing promotion actions, keeping registers updated, and carrying out all the operations related to control, verification, and labelling.

The application is then submitted to the appropriate national authorities (e.g. Ministry of Agriculture), and it is not until after it has been accepted at the national level that the registration procedure can continue with the European Commission, which publishes the final approval in the Official Journal of the European Union. Any country can submit objections on the basis of conflicts of the product name with a trademark that has been on the market for at least five years or with a generic name, or allegations to the effect that the product does not meet the required conditions. Countries outside the European Union can also register their own products following a similar procedure, provided that they can give reciprocal protection for EU PDOs/PGIs as well as guarantees, inspection and objection measures identical or equivalent to those provided by the EU.

There have been several objections by third countries when producers have tried to register specific names under these EU regulations. A good example is 'Feta' cheese, which was initially recognized by the EU as a Greek PDO in 1996. It suffered objections from Denmark, Germany and France, however, who claimed that they also produced cheese under the name of Feta, and accordingly saw their production jeopardised because of the prohibition of using this name once it was assigned exclusively to Greek producers. Their claim was based on the idea that Feta is a generic name, which consumers commonly use to refer to that specific type of goat's cheese. The Greek argument, on the other hand, was based on the historical link between the product and the geographical area, the national regulation which had been in force since 1935, the specificity of the product (sheep's and goat's milk) and the manufacturing process, and the interaction between environmental conditions (dry climate, grazing pastures) and the characteristics of the final product. It was further argued that these conditions had been distorted in other countries (e.g. mixture with cow's milk, and use of bleaching agents). Ultimately, in 2002, the name 'Feta' was confirmed as a Greek PDO.

The detailed description of specific characteristics of the PDO/PGI product in the product specification may become an important issue for providing the right protection. This point is illustrated by the cases of two Italian products, PDO 'Prosciutto di Parma' (Parma ham) and PDO 'Grana Padano' (cheese). The ASDA chain of supermarkets in the United Kingdom sells PDO Parma ham, sliced and packaged in the UK. Similarly, the French company Ravil imports, grates, pre-packages and distributes Grana Padano cheese in France. The Consorzio del Prosciutto di Parma brought proceedings in the UK against ASDA and the firm in charge of slicing and packaging; while Biraghi, an Italian producer of Grana Padano, and the exclusive importer in France (Bellon) of grated Grana Padano cheese, brought the case in France against Ravil. In both cases it was alleged that slicing, grating and packaging should be done in the region of origin in order to retain the right to use the certification PDO 'Parma Ham' and PDO 'Grana Padano', respectively. The cases were presented in the UK and French courts respectively and were

referred to the European Court of Justice for a preliminary ruling on the interpretation of the EU regulation on PDO. In 2003, the Court of Justice concluded in favour of the complainants on the grounds that the grating of cheese and slicing of ham and the packaging constitute important operations which can damage the quality and authenticity and consequently the reputation of the PDO if the requirements are not complied with. However, these operations were prohibited to operators outside the production region only because they were expressly laid down in the specification of the product.

## Protected Designations of Origin, Geographical Indications and Traditional Specialities<sup>4</sup>

### European Union

There is no doubt that the European legislation on food quality linked to origin has been successful in attracting producers. By July 2006, there was a total of 710 PDO and PGI-registered products – an increase of 6% compared to 2004. Some 60% of these 710 products are PDOs. The TSG label clearly lags behind, however, and is applied only to 15 food products (European Commission, 2006).

The majority of the protected food products are located in Mediterranean countries, which is to be expected due to the fact that they have existed in those countries for a long time. Italy, with 155 PDO/PGI and 1 TSG, ranks first, followed by France with 148 PDO/PGI food products. These two countries account for 42% of the total number of quality-certified food products in the European Union. Spain accounts for 13.8% of the total number of certified products, followed by Portugal (12.8%) and Greece (11.4%) (see chart 1).

The history of origin labelling in the Northern countries starts with the EU legislation adopted in 1992, which thus clearly lags behind that of the Mediterranean countries. Germany has 67 PDOs/PGIs, while the United Kingdom has only 29 PDO/PGI products and 1 TSG. The 10 new members of the EU do not yet have any quality certification (with the exception of the Czech Republic with 3 PDO beers), while the rest of the EU countries each account for less than 1% of the total number of products registered.

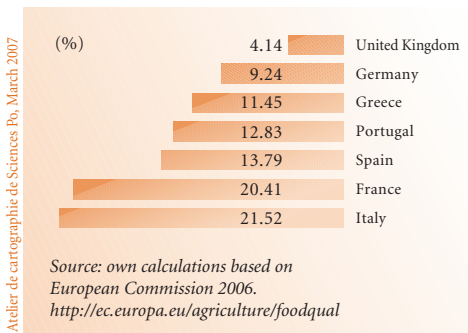
A comparison across food categories reveals that 'Cheese' ranks first, with 155 PDOs/PGIs and 2 TSGs, followed by 'Fruit, Vegetables & Cereals' with 146 products registered as Protected Designation of Origin or Geographical Indication (also including pulses) (see Chart 3). These two categories of food account for 42% of the total number of registered products (see Chart 2). There is a total of 102 certifications within the category of 'Fresh meat' as of July 2006 covering beef, lamb, pork, poultry and offal,

---

4 - The wine sector is excluded from the analysis as it is ruled by specific regulations which concern not only quality and geographical indications but also the common market organisation and are thus different from those designed for food products within the framework of European food quality policy.

94 certifications of ‘Oils and fats’, with a much higher representation of olive oil than of butter, and 79 certifications of ‘Meat-based products’. The category of ‘Other drinks’ mainly includes mineral and spring waters and cider; these products are located mainly in Germany, France and the United Kingdom, with a total of 39 PDO/PGI. A further 24 ‘Other products of animal origin’ are to be found such as honey, eggs and dairy products (excluding butter), with the same number of PDOs/PGIs for ‘Beer’. The categories with the least number of products registered are ‘Other food products’ such as spices and condiments (e.g. PDO ‘Azafrán de La Mancha’, saffron from La Mancha in Spain), ‘Non-food products’ such as essential oils (e.g. PDO ‘Huile essentielle de lavande de Haute Provence’ in France), and ‘Fresh Fish’ (e.g. ‘Anchois de Collioure’ – anchovies from Collioure – in France), with less than 10 registered names.

**Chart 1 - Distribution of the number of PDO, PGI and TSG food products across EU countries**



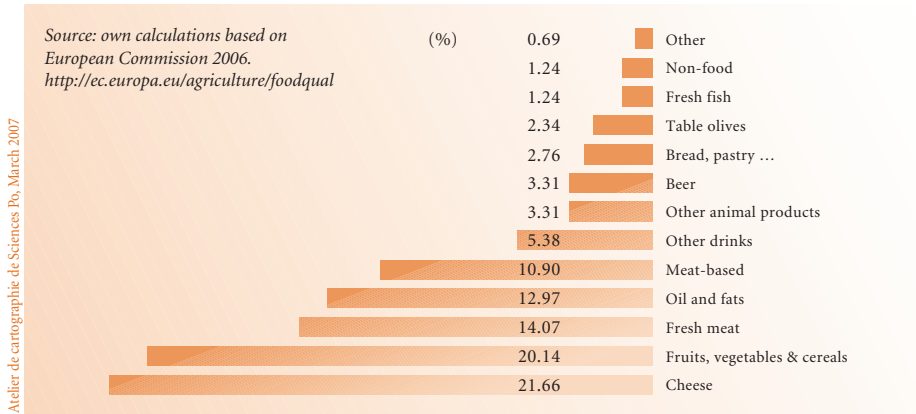
The sources of statistics on production quantities and values for each category of products or each certified product are dispersed across countries, whilst there is no single European statistical source that aggregates the information. There are thus no global data on the economic value of origin-certified food products in the EU as a whole and, accordingly, no overall estimates of their weight in the turnover of the agro-food industry.

To provide some economic figures, this section focuses on those countries where origin-certified products have a broader

presence, and also on those sectors with the highest concentration of origin labels. Normally, data are collected by the regulatory or inspection bodies for each PDO/PGI, and then the respective national Ministries of Agriculture, Fisheries and Food further elaborate the data to produce some aggregate figures. In 2005, the ‘Istituto di servizi per il mercato agricolo alimentare’ (ISMEA) in Italy issued a report collecting data from different official sources across the EU. Although the main body of the report is devoted to Italy, there is some information about other Mediterranean countries such as France, Spain, Portugal and Greece. Whenever possible, these data have been updated, making use of national statistics, but in most cases, the information provided in this section comes from the above-mentioned report.

In Charts 4 to 6, country shares in terms of the number of PDO/PGI products registered and production volumes are shown for three sectors: ‘olive oil’, ‘cheese’ and ‘fruits, vegetables & cereals’. Only the Mediterranean countries are shown, as most of these products are concentrated there.

**Chart 2 - Distribution of the number of PDO/PGI and TSG across food categories**



Mediterranean countries account for 88 PDO/PGI-registered names for olive oil, of which almost half are located in Italy (43%), followed by Greece (28%) and Spain (16%). However, there is no correspondence between the number of PDO/PGI products and the volume of production. Spain is the main producer, accounting for 46% of total PDO/PGI production, whilst Italy comes second. Despite the large number of origin-certified olive oils in Greece, the total output accounts for only 11% of the production of the Mediterranean countries.

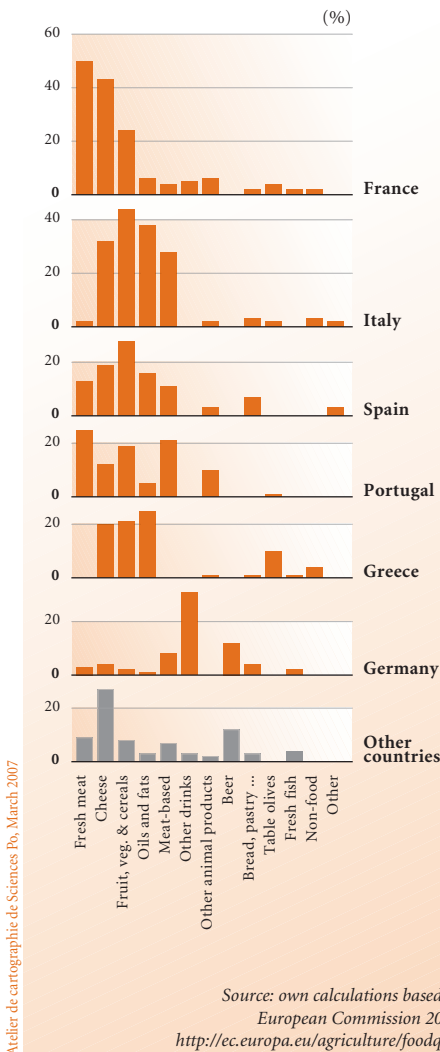
There are 126 cheese products with Designation of Origin or Geographical Indication located in the Mediterranean European countries. France accounts for 34%, followed by Italy (25%), whilst Greece and Spain have a similar number of protected cheeses. As in the case of olive oil, there is no direct correspondence between the number of products and the quantity produced. Thus, although France is the main country in terms of the number of cheeses with a Protected Designation of Origin, the quantity produced is only second to Italy, while Spain, with 15% of PDO/PGI products, produces only 3% of the total output.

Within the category of 'Fruits, Vegetables & Cereals', the five Mediterranean countries produce a total of 136 PDO/PGI products. One third of them are located in Italy but account for only 5% of the volume produced. Interestingly, one fifth of the total PDO/PGI labels are located in Spain, which also contributes the largest proportion in terms of volume. France, in contrast, is the second main producer with only 18% of the products labelled as PDO/PGI.

The figures show that there is a lack of correspondence between the number of origin-certified products and the market share. This is largely explained by the fact that such origin-labelled products are typically produced by small-scale producers. However,



**Chart 3 - PDO/PGI & TSG products registered per sector and country**



within the same category of food products, some Designations of Origin achieve higher prices on the market than others, and, accordingly, the economic impact is not perfectly correlated with the number of products or even the volume of production (see below, for instance, the case of olive oil in Spain and Italy). The next paragraphs present a more detailed description for specific countries.

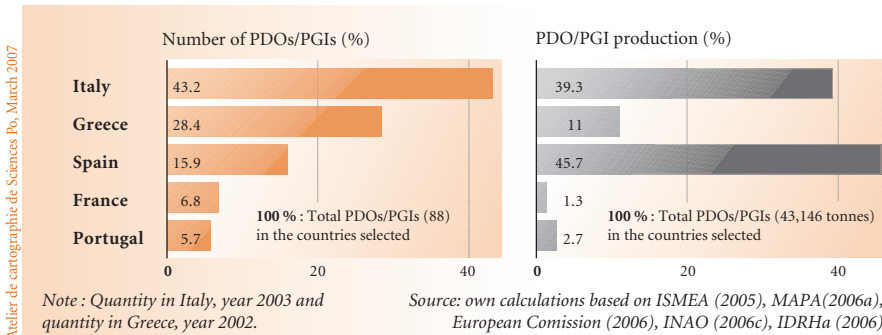
## France

The majority of PDO/PGI products in France are concentrated in the cheese and fresh meat sectors. Of the 157 cheeses protected with any of the three EU quality certification schemes, 43 specialities are produced in France (see Appendix Table 1). According to estimates of the Institut National d'Appellations d'Origine – INAO – (2006b), PDO cheese production in France amounted to 193,865 t in 2004, i.e. 17.3% of total French cheese production. The turnover of the whole supply chain of PDO dairy products is estimated at 2,000 million by the INAO. Around 30,000 milk producers are involved in the sector, 1,400 of whom are also involved in the cheese-making industry, at any or all of the manufacturing stages, together with around 625 processors including cooperatives and private firms. Four PDOs account for half of the production of Designation of Origin cheese in France –

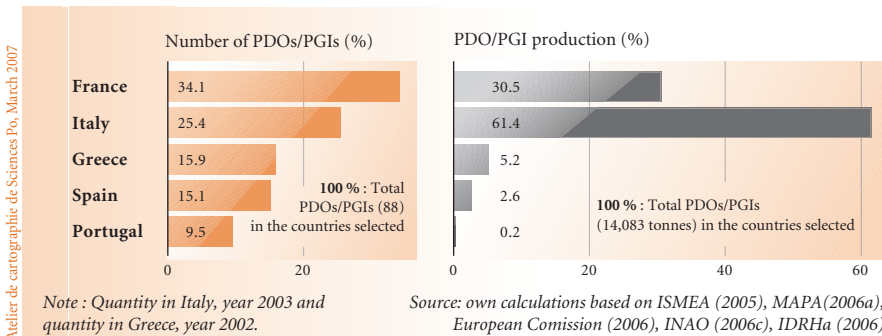
'Comté' (22.4%), 'Cantal' (9.7%), 'Roquefort' (9.7%) and 'Reblochon' (8.6%) – and cow's milk cheese predominates (around 85%). PDO cheese is not only consumed in France – its reputation has enhanced exports. According to INAO statistics (INAO (2006b)), almost 6% of total PDO cheese output was exported in 2004, 'Roquefort' ranking first with 3,509 t (19% of total production) and 'Comté' second with 2,683 t (6% of total production).



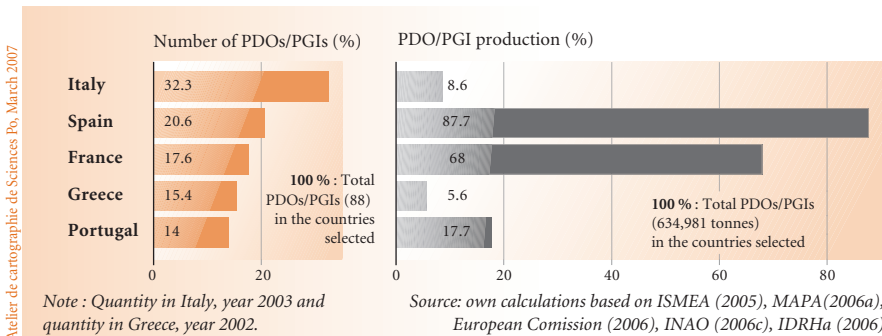
**Chart 4 - The PDO/PGI olive oil sector**



**Chart 5 - The PDO/PGI cheese sector**



**Chart 6 - The PDO/PGI fruit, vegetables and cereals sector**



Half of the fresh meat products protected with a PDO/PGI are located in France. This country has 50 PDOs/PGIs in the fresh meat sector, with poultry representing the main sub-sector (31 PGIs). Available data on 16 PGIs point to an output of 138,658 t and 1,505 million in 2003 (ISMEA, 2005).

Within the category of ‘Fruit, Vegetables and Cereals’, France ranks third after Italy and Spain, with 24 products registered. In 2004, the volume achieved by the nine PDOs was

29,360 t (INAO, 2006c). The most important PDO products are ‘Coco de Paimpol’ (8,392 t) and ‘Noix de Grenoble’ (5,455 t). The latter represents 14% of the total production of walnuts in France. The sub-group of PGIs within the fruit and vegetables sector produced 66,057 t in 2002, with an approximate economic value of 131.18 million (ISMEA, 2005), of which one product, PGI ‘Pruneau d’Agen’ constitutes 61% of the total.

## Italy

The majority of PDO/PGI labels in Italy are to be found in the category of ‘Fruit, Vegetables & Cereals’ accounting for 12,121 t (2003 data) achieved with 44 such PDO/PGI products. In value terms, this corresponds to 14.1 million (Appendix Table 2). The PGI ‘Nocciola del Piemonte’ (hazelnuts) accounts for almost half of the sales value. The second sector in terms of the number of PDO/PGI-registered designations is Olive Oil. In 2003, 16,943 t were produced with a value of 102 million. The three main origin-certified olive oils are PDO ‘Terra di Bari’, PGI ‘Toscana’ and PDO ‘Riviera Ligure’, and they account for 90% and 83% of total production and sales value respectively (ISMEA, 2005). A further cursory view of the data shows that a significant part of the value of production in both sectors is generated through export revenue. More specifically, exports represent about 8% and 13% of the production value of the ‘Fruit and Vegetables’ and ‘Olive Oil’ sectors respectively. However, the latter two sectors are not the most important for the Italian PDO/PGI industry in economic terms.

Although they have a relatively smaller number of PDO/PGI registered products, the cheese and meat-based sectors account for 95% of the total value of origin-certified products. Italy has 32 Protected Designations for cheese. Although this figure is lower than France, Italy produces a quantity that doubles French PDO cheese production. According to the ISMEA report (2005) based on statistics provided by the inspection bodies, 390,207 t of certified cheese were produced in 2003. Most of the production is concentrated on 6 PDOs: ‘Grana Padano’ (31%), ‘Parmigiano Reggiano’ (28%), ‘Gorgonzola’ (10%), ‘Pecorino Romano’ (8%), ‘Mozzarella di Bufala Campana’ (7%) and ‘Asiago Pressato’ (5%). According to the same source, the turnover was 2,650 million in 2003, at producer level, and 3,948 million at consumer level. The PDOs with the highest turnover are ‘Parmigiano Reggiano’ and ‘Grana Padano’, which account for 39% and 29% of sales respectively. Export markets are an important destination for Italian PDO cheese. In 2003, 19% of the total quantity produced was exported, EU countries being the main destinations. The PDOs with more weight in production are also strongly export-oriented. For instance, in 2003, 12% of PDO ‘Parmigiano Reggiano’ was exported, and 70% of these exports were sent to other EU countries; in the same year, 22% of ‘Grana Padano’ was exported, and 60% of those exports were sent to European markets (ISMEA, 2005). Other important destinations outside the EU are Switzerland and the United States.

The output of the 28 PDO/PGI meat-based products in Italy amounted to 172,026 t with a monetary value of 1,473 million. This is the second largest sector in terms of turnover and the first in terms of exports (42%). PDO 'Prosciutto di Parma' is the main origin-certified food product in Italy, accounting for 24% of the total turnover of all sectors and representing half of the quantity and value of certified meat-based products in Italy. Other important certified products in this category are PDO 'Prosciutto San Daniele' and PGI 'Mortadella Bologna', with a 16% and 10% market share respectively.

## Spain

Spanish origin-certified products are mainly concentrated in the 'Fruit and Vegetables' sector (see Appendix Table 3). A total of 28 products are currently approved by the EU, and 10 have been recognised under Spanish legislation but are still waiting for final approval at the European level. A total of 123,179 t of registered fruit and vegetables was produced in 2004, amounting to 117.8 million or 18.7% of the total economic value generated by origin-certified products. Of this total, almost 25% was destined to export markets (mainly the other EU countries). The three economically most important products are PGI 'Espárrago de Navarra', PDO 'Nísperos Callosa d'en Sarria' and PGI 'Manzana de Girona', which together account for 43% of the total value of this sector.

The second sector in terms of the number of registered names – although the first in terms of economic weight – is cheese. Spain has 19 PDOs producing 16,454 t of cheese, with an economic value of 131.92 million in 2004 (MAPA, 2006a). Although this is an important economic sector within Spanish origin-certified products, its weight in the European context is limited, since Italy and France clearly dominate the market. The sales of PDO 'Queso Manchego' dominate the sector (around 50%), followed by PDO 'Idiazabal' (11%) and PDO 'Mahón' (10%). Exports represent 23% of the economic value of origin-certified cheese in Spain, and destinations are divided equally between the EU and third countries.

Within the 'Oils and Fats' category Spain has 16 approved PDO/PGIs, 14 of which are olive oils. Virgin olive oil output amounted to 19,735 t in 2004 (MAPA, 2006a) with an economic value of 68.4 million (11% of the total value achieved by origin-certified food products). Although Spain accounts for 17% of the total number of PDO/PGIs in olive oil (and fats in general), lagging clearly behind Italy (40%) and Greece (26%), it is the main producer in quantity, but not in the generation of economic value. Italy, where output amounts to 85% of Spanish output achieves 49% more in value. The PDO 'Siurana' and PDO 'Baena' are the most important PDO olive oils in Spain with respective market shares of 20% and 18%. As in other origin-certified sectors in Spain, export markets are a common destination for olive oil, accounting for 15.6% of total production value.

The importance of cured ham in the origin-certified food supply (12.5%) is similar to that of olive oil, although its presence on export markets has been limited to date. This is also the case with fresh meat, which with 13 PDO/PGIs accounts for 20% of the total value of certified products, although exports represent less than 1%.

## Portugal

Portugal has a total of 19 'Fruits and Vegetables' registered as PDO/PGI and it is the most important component within the Portuguese sector of origin-certified products (almost half of the total sales value) (see Appendix Table 4). Moreover, this is the sector that is geared most to export markets, since 86% of total output is exported (IDRHa, 2006). In 2004, output amounted to 24,856 t, with an estimated economic value of 27.9 million, far behind the main producers, France and Spain. One single product, PDO 'Pêra Rocha do Oeste' accounts for 60% of the total value (IDRHa, 2006).

The second sector in economic importance is cheese, with 12 registered PDO/PGIs and representing 21% of the value generated by the origin-certified food sectors. The main PDO cheeses in Portugal are 'Queijo Sao Jorge' and 'Queijo de Nisa', with 32% and 15% of market share (in value) respectively.

Although the fresh meat sector has the largest number of PDO/PGIs (25), it ranks third in economic value (14.5%) and is devoted entirely to the domestic market. Beef is the most important product (67%), and within this category PDO 'Carnalentejana' is the main PDO.

## Greece

Greece, with 20 PDOs, ranks third in the number of cheeses protected with a Designation of Origin, although it lags far behind the main producers, Italy and France (see Appendix Table 4). The 2002 statistics indicate that the origin-certified cheese output was 33,000 t (around 14% of the total cheese production), amounting to a value of 155.8 million (ISMEA, 2005); this is 75% of the total value of origin-certified products. 'Feta' cheese is probably the most important PDO cheese in Greece with an output of 13,100 t. Olive oil is the second most relevant sector, with 25 PDO/PGIs and an economic value of 10.58 million, accounting for 5% of the total origin-certified output.

## Geographical indications and the World Trade Organization (WTO)

The use of geographical names to identify food and drink products is also a matter of debate in the WTO. Some members consider that the EU policy on Protected Designations of Origin and Geographical Indications limits foreign trade competition for much of its farm and food sector and that this contradicts the general trend of WTO negotiations, which focus on liberalising trade in agricultural products. A common framework for Geographical Indications was therefore proposed within the WTO negotiations and, in the Uruguay Round, a specific chapter in the agreement on Trade-Related aspects of Intellectual Property Rights (TRIPS) was devoted to Geographical Indications (GI). Under the TRIPS Agreement a Geographical Indication is defined as "an indication which identifies a good as originating in the territory of a Member, or a

region or locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin". Under the same agreement, country members were urged to provide national legal means of protection and enforcement in order to avoid misuse and imitations that might mislead the general public. Further protection was provided for wines and spirits under Article 23 (e.g. excluding the possibility of including words such as 'type' or 'style' together with a well-known origin, even if the true place of origin is indicated and there is therefore no danger of misleading consumers). In Article 24 some exceptions to the protection of Geographical Indications were allowed, for example, if the name was already protected as a trademark or if it had become a generic term (e.g. 'Cheddar', which in several countries refers to a type of cheese not necessarily made in that British location). Furthermore, negotiations were also proposed for establishing a multilateral system of notification and registration of Geographical Indications for wines.

The latter is part of the Doha Round Agenda, which also includes extending the highest level of protection in Article 23 beyond wines and spirits in order to avoid designations such as 'Canadian Parma Ham', for instance. In both areas currently under discussion, opinions are divided across countries. With respect to the multilateral registration of Geographical Indications for wines, the EU maintains that if a geographical indication is registered this would imply that the term is also protected in other WTO member countries, except in any countries which have lodged a reservation on permitted grounds (e.g. when the term has become generic). On the other hand, the joint proposal of Argentina, Australia, Canada, Chile, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Honduras, Japan, Mexico, New Zealand, Chinese Taipei and the US advocates a voluntary system of notification and registration, while China proposes an intermediate compromise between both positions.

Members' opinions are also divided with respect to extending the level of protection beyond wines and spirits. On the one hand, there is a group of countries (EU, Bulgaria, Guinea, India, Jamaica, Kenya, Madagascar, Mauritius, Morocco, Pakistan, Romania, Sri Lanka, Switzerland, Thailand, Tunisia and Turkey) that advocates extension of protection to food products, as they see the higher level of protection as a means of improving the market for their products by differentiating them more effectively from their competitors, and they object to other countries imitating and usurping their terms (e.g. Basmati rice, an Indian and Pakistani speciality, but patented by the US). The position of the EU (latest proposal circulated in June 2005) is to give any food product the same status as wines and spirits, i.e. to let them benefit from the higher level of protection in Article 23, the exceptions in Article 24, and the multilateral registration system (currently discussed for wines and spirits). The group of countries against the extension of protection are Argentina, Australia, Canada, Chile, Colombia, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, New Zealand, Panama, Paraguay, the Philippines, Chinese Taipei and the United States. They argue that providing more protection would be a burden and would disrupt existing legitimate marketing

practices. They also reject the accusation of usurpation, particularly when migrants have taken the methods of making the products and the names with them to their new homes and have been using them in good faith.

Beyond the country positioning in the general negotiations, disputes have also arisen on existing nationally protected names. For example, cases similar to the Feta dispute within the EU are those of the Mexican GI Tequila, between Mexico and the EU and China; the Italian GI Grappa, between the EU and South Africa; or the Czech GI Budweis as opposed to the trademark Budweiser in the US. Another interesting case which challenges the consistency of the entire European legislative framework on origin labelling with the WTO rules has been brought to the attention of the WTO by the US (in 1999) and Australia (2003). These countries alleged that in the EU territory there was lack of protection of pre-existing trademarks (similar or identical to a GI) and Geographical Indications for agricultural products and foodstuffs of non-EU origin. Moreover, concerns were raised about the availability of GIs and procedures for registering and protecting names. It was felt in particular that the European regulation was effectively limiting the use of GIs to products originating in the EU, thereby placing imports at a competitive disadvantage.

In March 2005, the WTO panel did not condemn the EU regulation as a whole but recommended that it be amended to correct two violations of the WTO rules and the TRIPS Agreement: first, in relation to the availability of GI protection and, second, to the procedure for obtaining GIs. With respect to the first point, the EU regulation provides that GIs from countries outside the EU may only be registered and thus protected if the government of the country where the GI candidate is located adopts a system of GI protection equivalent to that in the EU and provides reciprocal protection to products from the EU. The WTO panel viewed the meeting of these two conditions as a burden that constituted discrimination against non-EU products, violating the general WTO rules. With respect to the second point concerning the application procedure, the EU regulation provides that non-EU nationals seeking to register a GI located in a non-EU country must obtain pre-approval from their own government before applying to the European Commission, which again was considered as discriminatory.

Other complaints made by these two countries, however, were not found to violate the WTO rules. In particular, the WTO did not find any violation in the EU requirement that products bearing GIs from non-EU member states must be country-of-origin labelled whenever the protected name is identical to a EU protected name, as this measure is intended to avoid consumer confusion. Likewise, the EU provision allowing the co-existence of GIs and previously registered trademarks for the same region did not violate the TRIPS Agreement. The WTO panel pointed out that 600 GIs had been registered over eight years, while only four instances were identified in which the GI registration would result in a likelihood of confusion with a prior trademark.<sup>5</sup>

---

5 - More information on the current negotiations and state of disputes can be consulted in the WTO web page: [www.wto.org/english/tratop\\_e/trips\\_e/gi\\_background\\_e.htm](http://www.wto.org/english/tratop_e/trips_e/gi_background_e.htm).

## Geographical indications and consumers

The promotion of local food products is one of the objectives of both national and European legislation with a view to communicating to consumers the specific nature of these food products and their true origin so that consumers, whether nationals or from third countries, can make informed choices.

Origin may be a valuable differentiation tool, but the success of this policy is only possible if consumers respond to it. Although the evidence based on surveys focusing on consumers is fragmented across countries and food categories, the general trend observed is that consumers attach importance to origin as an attribute that influences their purchase decisions (see for instance, some results of the European Projects TYPIC (2005) and DOLPHINS (2002)). Some studies investigate the meaning of origin for consumers and extract different dimensions, either from qualitative (e.g. Tregear *et al.*, 1998) or quantitative techniques (e.g. Philippidis and Sanjuán, 2002; 2005). Components of the perception of origin include tradition and heritage, which emerge from specific environmental conditions, human resources and know-how developed over time within the region, specific or superior quality related to sensorial characteristics perceived by consumers either before consumption (e.g. shapes, colour, smell, etc.) or after consumption (taste, texture, salt contents, etc.), and nutritional properties. Likewise, these studies and others (e.g. Trognon, 1998; Kupiec and Revell, 1998; Sylvander *et al.*, 2000) also point to a symbolic or emotional dimension of origin related to natural, artisan or rustic characteristics of local products, to the civic commitment of consumers to supporting the maintenance of rural activities, or even to an exotic and gourmet component.

The marketing literature provides two main theoretical paradigms to understand why consumers may value origin and regional products: the country of origin approach and consumer ethnocentrism. Part of the literature on country of origin focuses on the image evoked by a country and how this image is transferred onto its products (e.g. German cars are reliable; French wines are sophisticated). Nonetheless, the same process may operate on the regional/local origin level. Thus, consumers' perception of the country's (region's) image is built upon several dimensions: the country's level of advancement, feelings about the country's people, desire for closer links with a country, quality, price, the level of market penetration of a country's products and prior satisfaction with its products (Papadopoulos and Heslop, 2003). However, in the literature we more frequently find studies on the image of the products originating from a specific country, more than the country image itself (Van Ittersum *et al.*, 2003). The country of origin of a product influences consumers' evaluation and purchasing behaviour through three interrelated mechanisms: cognitive, affective and normative (Lusk *et al.*, 2006; Verlegh and Steenkamp, 1999). The cognitive component refers to the beliefs and experiences of the consumer with respect to the product originating in a particular place. In this sense, origin can act as a quality cue, helping the consumer to infer the quality of the product before consuming it (e.g. if olive oil is Italian, it must be good). The affective



component works by evoking some sort of affective feelings in the consumer (e.g. memories of holidays in that place) whilst through the normative mechanism origin is valued because of social and personal values such the search for social status or prestige.

The second avenue of research which has been postulated to help us understand why geographical origin plays an important role in consumers' preferences is related to consumers' ethnocentrism. Ethnocentrism is a personality trait, which refers to the loyalty a person shows towards a particular origin, which in turn helps him/her to develop a cultural or ethnic identity. The term 'consumer ethnocentrism' (introduced by Shimp and Sharma, 1987) refers to the translation of these feelings of identity into purchasing behaviour that favours national products against foreign products. The same argument may be extended with respect to own region products. Thus, ethnocentric purchasing behaviour implies that the purchase of an own region product could be a moral act or an action aiming to sustain traditional local specialities and the way of life of local populations (see Van Ittersum, 1999 for an application of this concept to explain regional food buying behaviour). To sum up the approaches described above, the geographical origin affects consumer preferences and purchasing decisions, first, indirectly as a quality cue and, second, directly through the sense of belonging to the region of production and other affective aspects, or as a way to comply with ethical or normative rules through purchasing behaviour (Van der Lans *et al.*, 2001).

Origin is a credence attribute in the sense that the consumer can not verify the true origin of a foodstuff even after consumption. For this reason, certification becomes a necessary policy to guarantee authenticity and communicate the true origin to the consumer. However, the recognition of the European certification schemes, their logos and the meaning of these labels is still low. According to a survey conducted by the European Commission in 1999 (European Commission, 2004b) 80% of EU citizens had never heard of Protected Designation of Origins and 86% had never heard of Protected Geographical Indications. However, when the same question referred to the corresponding national names (e.g. Denominación de Origen in Spain or Appellation d'Origine Controlée in France, instead of the literal translation of PDO), the degree of awareness grew significantly (between 74% and 88%, in France, Spain and Italy). The degree of knowledge of specific PDO/PGI products, however, is not homogeneous. For instance, the awareness of PDO 'Roquefort' or PDO 'Prosciutto de Parma' goes beyond national boundaries, while other local specialities are only known in the vicinity of the area of production and never cross regional boundaries (examples can be found in Sanjuán *et al.*, 2006). Generally speaking, consumers attach references of superior quality, safety, control, and authenticity, to origin-certified products (see for instance results of the European projects TYPIC (2005) and DOLPHINS (2002)) and, accordingly, some studies show that consumers are willing to pay a higher price for the certification (e.g. Fotopoulos and Krystallis, 2003; Skuras and Vakrou, 2002). However, the evidence on this is not wholly conclusive and differs from one valuation method, product and country to another.



## Organic Food

### Definition

The term ‘organic farming’ covers a range of techniques which aim to promote the sustainability of ecosystems, maintaining or increasing the fertility of the soil, returning to the soil the nutrients found in waste products, and providing food products containing all their natural properties. Organic farming respects the environment’s own systems for controlling pests and disease in growing crops and raising livestock and avoids the use of synthetic pesticides, herbicides, chemical fertilisers, growth hormones, antibiotics or gene manipulation. Likewise, when meat production is concerned, special emphasis is placed on animal welfare and the use of natural feeding.<sup>6</sup>

### Legislation

The first European regulation on organic farming dates back to 1991 (Regulation EEC 2092/91), and in 1999 (Regulation EC 1804/99) the scope of organic practices was extended to cover organic livestock production. Regulations have been introduced to ensure the authenticity of the organic production of crops and livestock and cover rules on production (e.g. manure, disease prevention, control and treatments, animal welfare, exclusion of GMOs) and on the inspection, labelling, processing and marketing of organic food products. The rules also govern imports of organic products from third countries outside the EU. Farmers who claim official recognition of their organic status need a minimum conversion period of two years before sowing annual crops and three years in the case of perennials. In 2000, the European Commission introduced a logo to be used on a voluntary basis by producers whose systems and products comply with EU organic farming regulations. This logo guarantees to the final consumer that at least 95% of the product’s ingredients have been organically produced, that the product complies with the rules of the official inspection scheme, that the product has come directly from the producer or preparer in a sealed package, and that the product bears the name of the producer and intermediaries and the name or code of the inspection body.

### Some figures

In terms of organic land, according to the survey carried regularly by IFOAM, more than 31 million hectares of farmland are currently under organic management worldwide, a gain of five million hectares compared to 2004, mainly located in China. Australia leads with 12.1 million hectares, followed by China (3.5 million hectares) and Argentina (2.8 million ha). Most of the world’s organic land is in Australia (39%), followed by Europe (21%) and Latin America (20%).

The total organic area in the EU-15 – fully converted and under conversion – increased from 2.3 million hectares in 1998 to 4.9 million hectares in 2002 – an increase

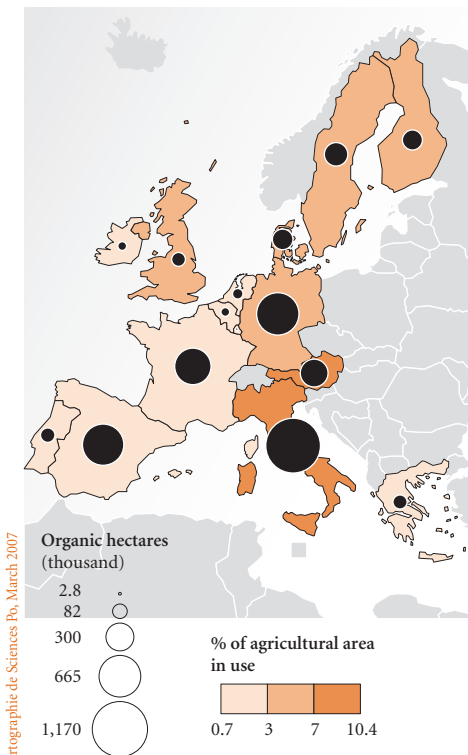
---

6 - <http://ec.europa.eu/agriculture/qual/organic>

from 1.8% of the total agricultural area in use (AAU) of the EU-15 to 3.8% – while the number of organic producers remained stable at 2% of the total number of farmers (Rohner-Thielen, 2005). This means an annual increase of 21% during that period. The EU countries with the highest annual growth rates in the 1998-2002 period were the United Kingdom (75%) and Greece (49%). The member states contributing most to the organically cultivated area are Italy (24%), the United Kingdom (15%), Germany and Spain (around 14%), and France (over 10%) (see Map 1).

As regards the share of organic farmland in the total agricultural area in use, Austria ranks first, with 10%, followed by Italy, with almost 9% (see Map 1). The Scandinavian countries, Sweden, Finland and Denmark, devote over 6% of the agricultural area to organic farming. The EU country least oriented towards organic farming is Ireland, with less than 1% of farmland managed organically.

**Map 1 - Organic farmland in EU-15**



Atelier de cartographie de Sciences Po, March 2007

Source : E. Rohner-Thielen, "Organic Farming in Europe", EUROSTAT, Statistics in Focus, Agriculture and Fisheries, 2005

The main organic crops are forage crops, pastures and meadows, which account for more than 50% in every EU country with the exception of Portugal and Spain, where this proportion drops to 39% and 31% respectively. Cereals and pulses are the second largest component of organic crops, accounting for more than 20% in Belgium, Denmark, Italy and Portugal. The organic olive sector is of considerable significance in the total organic area in the Mediterranean countries: Greece and Portugal (more than 15%), Spain (about 14%), and Italy (around 7%) (Rohner-Thielen, 2005). The organic area of fresh vegetables is still very low in comparison to other crops. The Netherlands is the only country where the area devoted to organic fresh vegetables represents more than 5% of the total organic area, while in the remaining countries it accounts for less than 1%.

## The market

Several studies have explored the potential development of the European organic market from the demand perspective (e.g. Baourakis, 2004; Wier and Calverley, 2002; Michelsen *et al.*, 1999), while others have focused on the enlargement of country-specific markets (e.g. Sanjuán *et al.*, 2003, in Spain; or Kleijn *et al.*, 1996, in the Netherlands).

In all of these studies, the research of the underlying motivations driving consumers to buy organic food are explored, and it is found that consumers mainly buy organic food products on environmental protection and ethical grounds (animal welfare) and/or because they seek natural and healthy food products (e.g. Grunert and Juhl, 1995).

Organic food products command a higher price than conventional food products, and this may constitute an obstacle to expansion unless consumers are willing to pay this premium. In 2004, the market value of organic products worldwide reached 27.8 billion US \$ (IFOAM, 2006), the largest share being marketed in Europe and North America (see Chart 7). Organic food accounts for 2% of the food purchase basket on average. Consumers in Denmark and Switzerland show the highest propensity to buy organic food products, spending 5% and 4% of the food budget on organic food respectively. In other European countries, however, this percentage is below 1%. So although the organic world and the European market are enlarging, organic food still constitutes a niche market, where the supply is addressed to consumers with specific concerns about environmental protection or animal welfare and to consumers who are particularly concerned about the effect of food on their health.

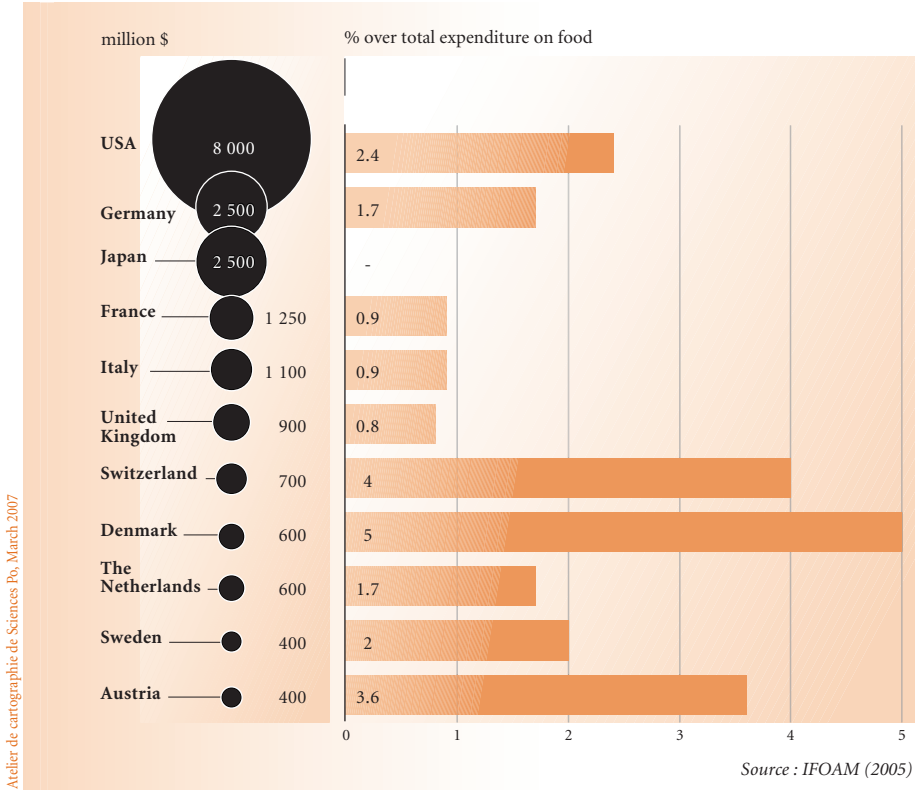
## Final considerations

The markets for origin-certified food products are growing across Europe. As an illustration, in Spain, there were 39 PDO/PGI products in 1995 amounting to a value of 233.7 million, while by 2006 the number of PDO/PGI had risen to 126<sup>7</sup> with an economic value (at production level) of 629 million. Although in some countries, specific PDO/PGI sectors constitute a considerable proportion of the total agro-food sector (e.g. PDO cheeses account for 17% of total cheese output in France (INAO, 2006b) this does not apply to every country. In Spain, for instance, the PDO/PGI sectors represent around 0.8% of the total sales value of the agro-food industry. Interestingly, the growth of the market for origin-certified products is enhanced not only by domestic demand but also by the export markets, although not with the same intensity across countries and product categories (export markets are essential, for instance, for the development of some origin-certified wines and cheeses, while they have only marginal impact on fresh meat). Thus, the differentiation of food products through origin allows European producers not only to defend their domestic market shares from increasing liberalisation of international trade, but also to conquer new markets thanks to the specificity of their supply.

The WTO and EU regulations have stimulated interest in and concern about GIs. An example is the creation of OriGIIn, the Organization for an international Geographical Indications network, which represents over one million producers of traditional products from more than 30 countries spread across Africa, Asia, Latin and North America, and Eastern and Western Europe. The main objectives of this organisation are

---

7 - This figure includes not only the PDO/PGI & TSG approved by the EU but also those approved by national regulation and whose application has been submitted to the EU.

**Chart 7 - Sales value of organic food products**


to promote the recognition of the role of GIs in sustainable development and to obtain greater protection for GIs at the national, regional and international level. These objectives are considered to be better achieved through the sharing of experiences in establishing and protecting Geographical Indications and the exchange of information between producers of developed and developing countries.

Origin-certified products are at the core of the European food quality policy. If the current trend continues, we are likely to witness further development of these products and their markets beyond the frontiers of Europe in the future as additional countries join the policy of stressing the uniqueness of their local productions.

## Appendix

Table 1 - The PDO/PGI and TSG sectors in France

	Number of PDO/PGI July 2006 <sup>(1)</sup>	Number of STG July 2006 <sup>(1)</sup>	Number of TSG July 2006 <sup>(1)</sup>	% Number PDO/PGI & TSG 2006	PDO Quantity 2004 (t)	PGI Quantity 2004 (t)	PGI Economic value 2004 (million €)
Cheese	43	0	43	29.05	193,865 <sup>(2)</sup>	...	
Fruit, veg. & cereals	24	0	24	16.22	29,360 <sup>(3)</sup>	66,057 <sup>(3)</sup>	131.18 <sup>(3)</sup>
Fresh meat	50	0	50	33.78	1,505	138,658 <sup>(4)</sup>	588.61 <sup>(4)</sup>
Oils and fats	6	0	6	4.05	556 <sup>(5)</sup>	n.a.	n.a.
Olive oil					n.a.	n.a.	n.a.
Butter					n.a.	n.a.	n.a.
Meat-based	4	0	4	2.70	n.a.	n.a.	n.a.
Other drinks	5	0	5	3.38	n.a.	n.a.	n.a.
Other animal products	6	0	6	4.05	n.a.	n.a.	n.a.
Bread, pastry ...	2	0	2	1.35	n.a.	n.a.	n.a.
Table olives	4	0	4	2.70	185 <sup>(6)</sup>	n.a.	n.a.
Fresh fish	2	0	2	1.35	n.a.	n.a.	n.a.
Non-food	2	0	2	1.35	n.a.	n.a.	n.a.
<b>Total</b>	<b>148</b>	<b>0</b>	<b>148</b>	<b>100</b>			

Sources: (1) Own calculations based on European Commission (2006); <http://ec.europa.eu/agriculture/foodqual/>; (2) INAO (2006b); (3) INAO (2006c); (4) Year 2003. It only includes the quantity and value of 16 of the 47 PGIs. Source ISMEA (2005); (5) Production of PDO olive oil in 2004. Source INAO (2006a). (6) Production of PDO table olives in 2004/2005. Source INAO (2006a).

Table 2 - The PDO/PGI and TSG sectors in Italy

	Number of PDO/PGI July 2006	Number of TSG July 2006	Number PDO/PGI & TSG July 2006	% Number PDO/PGI & TSG 2006	Quantity traded 2003 (t)	Economic value 2003 (million € at production level)	% Economic Value 2003	Exports Quantity 2003 (t)	Exports value 2003 (million €)	Exports % Quantity 2003	Exports % Value 2003
Cheese	31	1	32	20.51	390,207	2,650.31	62.14	75,091	559.89	19.24	21.13
Fruit, veg. & cereals	44	0	44	28.21	12,121.28	14.15	0.33	1,366	1.14	11.27	8.07
Fresh meat	2	0	2	1.28	n.a.	24.21	0.57	n.a.	n.a.	n.a.	n.a.
Oils and fats	38	0	38	24.36	16,943	102.74	2.41	1,192	13.97	7.04	13.61
Olive oil					16,943	102.74	2.41				
Butter											
Meat-based	28	0	28	17.95	172,026	1,473.90	34.56	27,716	627.20	16.11	42.55
Other drinks	0	0	0	0.00							
Other animal products	2	0	2	1.28	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.
Bread, pastry ...	3	0	3	1.92	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.
Table olives	2	0	2	1.28	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.
Non-food	3	0	3	1.92	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.
Other	2	0	2	1.28	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.
<b>Total</b>	<b>155</b>	<b>0</b>	<b>156</b>	<b>100</b>	<b>591,297</b>	<b>4,265.32</b>	<b>100</b>	<b>105,366</b>	<b>1,202.21</b>	<b>17.82</b>	<b>28.19</b>

Source: Own calculations based on ISMEA (2005) and European Commission (2006), <http://ec.europa.eu/agriculture/foodqual>.

**Table 3** - The PDO/PGI and TSG sectors in Spain

	Number of PDO/PGI July 2006	Number of TSG July 2006	Number of PDO/PGI & TSG July 2006	% Number of PDO/PGI & TSG 2006	Number of PDO/PGI 2004	Quantity 2004 (t)	Economic value 2004 (million €)
Cheese	19	0	19	19.0	23	16,454	131.92
Fruit, veg. & cereals	28	0	28	28.0	38	123,179	117.88
Rice					3	18,119	11.53
Vegetables					14	16,519	35.37
Fruit					16	88,036	69.13
Pulses					5	505	1.85
Fresh meat	13	0	13	13.0	15	31,087	130.72 <sup>(1)</sup>
Oils and fats	16	0	16	16.0	22	20,171	70.69
Olive oil					20	19,735	68.4
Butter					2	436	2.29
Meat-based	10	1	11	11.0	10	...	98.88
Cured ham		1	1	1.0	5	634,487 <sup>(2)</sup>	78.65
Other					5	3 358	20.23
Other drinks <sup>(3)</sup>	0	0	0	0.0	1	2,576 <sup>(3)</sup>	0.45
Other animal products <sup>(4)</sup>	2	1	3	3.0	3	312	2.14
Beer	0	0	0	0.0	0	0	0
Bread, pastry ...	6	1	7	7.0	8	10,119	87.84
Table olives	0	0	0	0.0	0	0	0
Fresh fish	0	0	0	0.0	3	8	0.04
Non-food	0	0	0	0,0	0	0	0
Other	3	0	3	3.0	3	1,872	18.68
<b>Total</b>	<b>97</b>	<b>3</b>	<b>100</b>	<b>100</b>	<b>126</b>	<b>...</b>	<b>629.01</b>

Table 3 - (contd.)

	% Number PDO/PGI 2004	% Economic Value 2004	Exports Quantity 2004 (t)	Exports value 2004 (million €)	Exports % Quantity 2004	Exports % Value 2004
Cheese	18.25	20.97	3,518	30.77	21.38	23.32
Fruit, veg. & cereals	30.16	18.74	32,371	29.08	26.28	24.67
Rice	2.38	1.83	41	0.06	0.23	0.52
Vegetables	11.11	5.62	330	0.56	2.00	1.58
Fruit	12.70	10.99	31,999	28.44	36.35	41.14
Pulses	3.97	0.29	1	0.01	0.20	0.54
Fresh meat	11.90	20.78	155	0.62	0.50	0.47
Oils and fats	17.46	11.24	2,919	10.82	14.47	15.31
Olive oil	15.87	10.87	2,895	10.69	14.67	15.63
Butter	1.59	0.36	24	0.13	5.52	5.69
Meat-based	7.94	...	...	1.42	...	1.44
Cured ham	3.97	12.50	6,372	0.33	0.10	0.42
Other	3.97	...	94	1.09	2.80	5.39
Other drinks <sup>(3)</sup>	0.79	0.07	0	0	...	0.00
Other animal products <sup>(4)</sup>	2.38	0.34	0	0	0.00	0.00
Beer	0.0	0.00	0	0	...	...
Bread, pastry ...	6.35	13.96	1,004	8.91	9.92	10.14
Table olives	0.0	0.00	0	0	...	...
Fresh fish	2.38	0.01	0	0	0.00	0.00
Non-food	0.0	0.00	0	0	...	...
Other	2.38	1.38	48	0.24	2.56	2.76
<b>Total</b>	<b>100</b>	<b>100</b>	<b>...</b>	<b>81.86</b>	<b>...</b>	<b>13.01</b>

Source: Own calculations based on MAPA (2006a).

(1) Includes fresh meat and meat-based products other than cured ham.

(2) Number of pieces.

(3) It only includes Cidre, quantity in Hl.

(4) It only includes honey.

(5) Including PDO/PGI admitted and recognized at national level but still under examination at the EU.



**Table 4 – The PDO/PGI and TSG sectors in Portugal**

	Number of PDO/PGI July 2006	Number of TSG July 2006	Number PDO/PGI & TSG July 2006	% Number PDO/PGI & TSG July 2006	Quantity traded 2004 (t)	Economic value 2004 (million €) <sup>(1)</sup>	% Economic Value 2004	Exports % Value 2004
Cheese	12	0	12	12.90	1,455.44	13.64	21.31	6.00
Fruit, veg. & cereals	19	0	19	20.43	24,856	27.93	43.64	86.00
Fresh meat	25	0	25	26.88	2,553.08	9.34	14.59	0.00
Oils and fats	5	0	5	5.38	1,170.76 <sup>(2)</sup>	5.45	8.52	1.00
Olive oil					1,170.761 <sup>(2)</sup>	5.45	8.52	1.00
Butter								
Meat-based	21	0	21	22.58	162.38	2.19	3.42	4.00
Other drinks	0	0	0	0.00				
Other animal products <sup>(3)</sup>	10	0	10	10.75	122.82	0.46	0.71	43.00
Beer	0	0	0	0.00				
Bread, pastry...	0	0	0	0.00				
Table olives	1	0	1	1.08	n. a.	n. a.	n. a.	
Fresh fish	0	0	0	0.00				
Non-food	0	0	0	0.00				
Other	0	0	0	0.00				
<b>Total</b>	<b>93</b>	<b>0</b>	<b>93</b>	<b>100</b>	<b>30,197</b>	<b>64.01</b>	<b>100</b>	<b>71.00</b>

Source: Own calculations based on IDRHa (2006) – [http://www.idrha.min-agricultura.pt/produtos\\_tradicionais/estatisticas/estatisticas.htm](http://www.idrha.min-agricultura.pt/produtos_tradicionais/estatisticas/estatisticas.htm)

(1) Economic value obtained multiplied the most frequent market price by quantity of each individual product, and added up; (2) Thousands of litres; (3) Honey.

**Table 5 - The PDO/PGI and TSG sectors in Greece**

	Number of PDO/PGI July 2006	Number of TSG July 2006	Number PDO/PGI & TSG July 2006	% Number PDO/PGI & TSG 2006	Quantity 2002 (t)	Economic value 2002 (million €)	% Economic value 2002
Cheese	20	0	20	24.10	33,000	155.80	75.16
Fruit, vegetables and cereals	21	0	21	25.30	7,866	5.59	2.70
Fresh meat	0	0	0	0.00			
Oils and fats	25	0	25	30.12	4,742	10.58	5.10
Olive oil					4,742	10.58	5.10
Butter							
Meat-based	0	0	0	0.00			
Other drinks	0	0	0	0.00			
Other animal products	1	0	1	1.20	n. d.	n. d.	n. d.
Beer	0	0	0	0.00			
Bread, pastry ...	1		1	1.20	n. d.	n. d.	n. d.
Table olives	10	0	10	12.05	1,000	7	3.38
Fresh fish	1	0	1	1.20	n. d.	n. d.	n. d.
Non-food	4	0	4	4.82	110	17.74	8.56
Other	0	0	0	0.00			
<b>Total</b>	<b>83</b>	<b>0</b>	<b>83</b>	<b>100</b>	<b>51,460</b>	<b>207,29</b>	<b>100</b>

Source: ISMEA 2005.



**2** PART TWO

**THE QUALITY OF  
MEDITERRANEAN  
FOOD PRODUCTS**

---

the case of milk products  
and milk derivatives



# ROQUEFORT

an emblematic RDO industry\*

*Julien Frayssignes*

## The founding principles of the Designation of Origin: from the local area to the region

In tandem with the establishment of an agricultural development model based essentially on intensive production, agriculture in France has, due to its history, been characterised since the 1960s by a strong political will to promote the quality and origins of agro-food products. The qualitative model has not replaced this concern to produce quantities but has gradually gathered momentum over the last twenty years as the interests of the various actors involved have converged. For the public authorities it was a matter of compensating for the decrease in farmers' incomes in so-called "difficult" regions, limiting farm concentration and combating rural decline. And the professionals in the various industries had the opportunity to protect and boost the image of products which were on their way out or, on the contrary, were victims of their own success and thus liable to be produced further afield.

This specific course of development thus gave rise to what are generally referred to today as Official Quality Marks, which, after the promulgation of the Agricultural Orientation Act in 1999, became Official Quality Identification Marks. The "Mountain" label, regional labels and the "Farm-produced" label, which is subject to special regulations in certain sectors, were added to the four main marks (Registered Designation of Origin, Red Label, Certificate of Product Conformity and Organic Agriculture).

This legal arsenal, which was designed as a tool for developing agriculture and preserving the national gastronomic heritage, but also for informing consumers, was subsequently recognised at the EU level, where the French Official Quality Identification Marks actually served as a frame of reference for Community work on elaborating a European Regulation (no. 2081/92) creating the Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI) (in 1992).

---

\* - This chapter uses some of the results of a doctoral thesis in geography which was defended in Toulouse in December 2005; it was financed by the CNIEL (National Inter-Trade Centre for the Milk Economy) and the CNAOL (National Council for Designations of Origin of Milk Products) in the context of an industrial agreement on training through research (CIFRE). This study concerned the cheese RDOs in the following regions: Normandy, Centre, South Aveyron, Savoy and Upper Savoy.

These various marks refer to different approaches to quality. Geographer S. Scheffer proposed that a distinction be made between the regional approach, the so-called qualitative approach and an approach based on a particular production method. The marks referring to a region (RDO, PDO, PGI and “Mountain Product”) aim to certify the link between the features of the products and the region (or “terroir”, i.e. local area<sup>1</sup>) where they are produced. The qualitative approach concerns the Red Label and Certificate of Product Conformity (CPC). Here it is a question of proving that a food product meets a number of criteria which are laid down in specifications and provide a means of differentiating between standard products that are similar. In the case of the Red Label, products must be high-quality goods, whereas in the case of CPC products the quality can only be specific. And finally, the approach based on a particular production method concerns Organic Agriculture, a method which is not widely developed in France, however (Scheffer, 2002)

In the present chapter we shall be focusing on the regional approach, and more specifically the Registered Designation of Origin. This is the oldest quality mark in France; it was created by a law passed in 1919, whose purpose was to protect a number of wine-growing regions (Champagne, Bordeaux, Cognac, etc.) from usurpations. Furthermore, despite considerable institutional developments, the concept of designation of origin is still based on the same principle of guaranteeing the link between the quality of a product and the features of a region. The various statutes concerning designations all have the same wording: “*A designation of origin is the denomination of an area, region or town/village serving to designate a product which comes from that place and whose quality or features are due to the geographical environment, including natural factors and human factors.*”<sup>2</sup>

This connection between a product and its production area immediately leads to the second principle: that of non-reproducibility. The recognition of an RDO necessarily implies that an area be delimited outside which it is legally impossible to produce the product in question. Professionals who wish to obtain a designation must thus prove that connection, which is also referred to as “typicality” and is defined by quality experts as “*the property of a product of belonging to a type which distinguishes it from similar products through features of the local area where the product is manufactured*” (Casabianca, Sylvander, Noël, Béranger, Coulon, Roncin, 2005). The premise underlying the principle of non-reproducibility is that every region or local area has unique features which it is impossible to imitate. The fact that an origin-labelled product cannot be reproduced elsewhere is most certainly the main feature constituting its originality. In principle, an RDO does not necessarily certify better quality; it certifies an origin – in other words, a specific quality. However, it is observed in actual practice that the link with the product’s origin is also intended to guarantee better quality.

1 - Term used here in the agronomic sense: combination of natural conditions (soil, climate, etc.) and know-how.

2 - Section A of the 1919 Act, Article L. 115-1 of the Consumer Code, Article L. 641-1 of the Rural Code. It should be pointed out that European Regulation no. 2081/92 also endorses this idea.

However, a designation of origin does not only designate a product or a place name; it also refers to a *subsector*, i.e. a series of actors involved in the manufacturing of the product and generally grouped in a management body (syndicate). This economic sense of the RDO is another facet of the designation. For the delimitation of an area implies that an activity is spatially fixed by law. The RDO is thus indirectly part of the regional development field, particularly since maintaining agricultural and agro-food activities is one of the objectives assigned by legislation to quality marks on a par with consumer information and safety, product quality and the enhancement of product value throughout the production chain. Article L. 640-1 of the Rural Code thus stipulates that: “*The policy pursued in the field of quality and origin of agricultural commodities (...) must meet the following objectives in general: promoting product diversity and identification of product features (...) with a view to enhancing consumer information and meeting consumer expectations; boosting the development of the agricultural and food sectors and enhancing product quality through clear market segmentation; stabilising agricultural and food production in the region and ensuring that the economic activity is maintained, particularly in disadvantaged rural areas (...); distributing the enhancement of the value of agricultural commodities evenly amongst farmers (...), processors and marketing firms.*”

The concept of designation is thus an obstacle to certain aspects of globalisation such as industrial relocation moves, which are relayed by the media and experienced as traumatic events by the population groups concerned. There is no doubt that over and above preserving a cultural heritage it is this dimension which is of greatest interest to many countries that are anxious to set up a similar system. The National Institute of Designations of Origin (INAO) plays a highlighting role in this context, particularly with regard to its action to promote the designation concept and its legal aid to producers, who are often isolated. As tools of fair trade, designations of origin are thus central to combating poverty and ensuring sustainable development. The “OriGIn” network (Organisation for an international Geographical Indications network), which is comprised of producers from all over the world, is today fighting to protect origin-related products through facilitated market access.

One can see that when construed in economic terms the principle of the link with the origin constitutes a particularly interesting framework for analysis in terms of regional development. However, the issues mentioned above (maintaining of farming activities, fair trade, development) do not alone suffice to justify questions concerning the assessment of the impact of quality marks on a region. Over and above questions of that nature it is the very future of the origin-related industries that is at stake. For it is those production systems in particular that face challenges at the world level that are reliable to threaten their very existence. The establishment of PDOs at the European level has given the products concerned a certain degree of legitimacy, but this is not the case at the world level, where designations – and geographical indications (GIs) – are constantly contested by many countries, which view them as obstacles to free competition. The current negotiations within the World Trade Organisation are thus faltering over the status of GIs: a principle in their own right on a par with marks, or a special arrangement?



The link with the “terroir” (= soil/local area and environment), which is often – and sometimes rightly – contested, does not seem to constitute an adequate basis for sound argumentation of designations.<sup>3</sup> It would thus seem necessary to extend the debate to include dimensions other than commercial or technical aspects, and it is from this point of view that research into the contribution made by geographical indications to development is of particular relevance. Quite apart from the economic importance of these special industries, which must be evaluated, to what extent are they an integral part of the development dynamics of their regions? What methodological tools can be set up to analyse this?

The present chapter aims to present the various assessment criteria through which this evaluation can be carried out. In order to give our analysis more concrete form, we shall focus more specifically on Roquefort cheese, an emblematic Mediterranean product which has enjoyed RDO protection since 1925. Apart from the length of time this industry has been in existence, it is a particularly interesting field of application in view of its considerable importance in terms of jobs in this economically and demographically fragile region.

We shall thus first expound the international issues justifying our questions: how are geographical indications viewed within the WTO? What is their status at the present time? How can reflection on development legitimise the place of GIs in world trade?

In the second part of the chapter we shall present the various indicators that were constructed in the course of the author’s thesis, taking the Roquefort RDO as an example. Various aspects will then be broached: the decisive economic significance of the industry in terms of agricultural and agro-food jobs; the RDO’s capacity to stabilise that economic activity over a long period; the benefits of the RDO for the production areas, particularly in terms of milk prices and boosting the image of the farming profession; the RDO’s propensity to generate a specific “production fabric” centred around sheep farming; and finally, the place of the RDO in the tourist industry, where amenities are gradually being developed, helping to qualify this region, particularly from the tourist point of view. We shall conclude our analysis with a discussion of the strengths and weaknesses of the course of development followed in the Roquefort region.

## Designations of origin facing international challenges

We have underlined the ambiguous nature of designations in the Common Agricultural Policy in another context; it is in fact difficult for mechanisms such as the decoupling of aids to take account of the specific nature of quality industries (Frayssignes, 2005). In the international context, however, this ambiguity becomes a head-on collision with certain countries which refuse to recognise the justification of a protection system based on a link with a product’s origin. This opposition does not concern solely the split

---

3 - It is furthermore revealing to note that the term “terroir” does not have an exact English equivalent.



between Europe and the United States – far from it; it concerns many other groups of countries and involves both commercial and cultural considerations.

It is thus with a view to a better understanding of the ins and outs of this thorny problem that the factors inherent in the legal status of geographical indications and the efforts to seek recognition of such indications in the World Trade Organisation will first be discussed. The regional aspects of the legitimacy of geographical indications will then be broached through the analysis of these international issues: to what extent can the concept of region – which is broader than that of local area – extend the perspective to other dimensions (political dimensions, dimensions concerning identity) and other actors? With what tools can the regional development process be evaluated?

## Partial recognition of Geographical Indications within the World Trade Organisation

Paradoxically, the process leading to the recognition of origin-labelled products is more international than European. The considerable increase in international trade at the world level after the 1950s led political leaders in the industrialised countries to come to agreements through which their foodstuffs could be mutually protected. The Lisbon Arrangement, which was signed by several states in 1958, provided the opportunity for mutual recognition of labelling systems, and France was thus able to have its designations of origin recognised by the other parties. Treaties specific to certain types of product were also signed, such as the Stresa Convention (Italy) on milk products, which was ratified in 1951. However, the impact of these various agreements has always been limited due to the limited number of signatories. Major trading powers such as Japan or the United States have never signed any of these conventions, for example. So it has never been possible to find a consensus on a minimum definition of the concept of designation of origin such as the definition prevailing in France, for instance.

The question of the status of designations of origin will be discussed from the point of view of the concept of intellectual property. In 1994, the Marrakech Agreement establishing the World Trade Organisation included the TRIPS Agreement,<sup>4</sup> which requires the members of the WTO to provide minimum levels of protection for copyright, brand names and patents. The European Union was anxious to assimilate food products to a form of intellectual property and succeeded in introducing protection for products with an official mark (PDO or PGI) indicating geographical origin. The concept of geographical indication (GI) as defined in Article 22 of the agreement seems close to the French concept of designation of origin: “*Geographical indications are, for the purposes of this Agreement, indications which identify a good as originating in the territory of a Member, or a region or locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin*”.<sup>5</sup> The rules for

---

4 - Agreement on Trade-Related aspects of Intellectual Property Rights.

5 - TRIPS Agreement, Annex 1C, Section 3, Article 22.

protecting these GIs, on the other hand, refer mainly to consumer information: “*In respect of geographical indications, Members shall provide the legal means for interested parties to prevent the use of any means in the designation or presentation of a good that indicates or suggests that the good in question originates in a geographical area other than the true place of origin in a manner which misleads the public as to the geographical origin of the good.*”<sup>6</sup>

Despite this apparent progress, this formulation does not create a high level of protection, since it is very difficult to prove that consumers have been deceived solely on this basis. With a view to remedying this deficiency, the professional representatives of wines and spirits – the leaders in the field – managed to obtain additional protection through Article 23, which introduces a supplementary clause: “*Each Member shall provide the legal means for interested parties to prevent use of a geographical indication... even where the true origin of the goods is indicated or the geographical indication is used in translation or accompanied by expressions such as ‘kind’, ‘type’, ‘style’, ‘imitation’ or the like.*”<sup>7</sup> This clause also prohibits widespread practices based on the use of denominations such as “Bordo” or “Koniak” which sound similar to the protected denominations (in this case Bordeaux wine and Cognac brandy). Negotiations to extend this clause to other types of product (milk products, meat products, etc.) have been failing, on the other hand, for several years; this is a field where there are also countless imitations, based either on the dishonesty of the cheaters or on regulations which are unfavourable for the products imitated. It is difficult to export Parma ham to certain countries (such as Canada or the United States) due to the existence of meat products on the market that are sold under a “Parma” brand name, which was registered before the PDO was ever obtained. The Parma Ham Consortium thus has to sell its products in these countries under another denomination, since legal proceedings have achieved very little.

This conflict, which has been observed for several years, is to be explained primarily by the split between Europe and the United States, for which GIs are merely a chapter in more extensive agricultural negotiations. The debate concerns other groups of states, however, including the Cairns Group, which is composed of 18 agricultural commodity exporting countries that are fighting to have customs barriers and export subsidies abolished and which support the United States on this issue.<sup>8</sup> Many developing countries (particularly in Africa, South America and Central America), on the other hand, see geographical indications as a major opportunity for facilitating market access for many small producers. As for China, despite its centuries-old agricultural tradition and the recent introduction of legislation in the field, the country’s position on geographical indications is still ambiguous.

6 - TRIPS Agreement, op. cit.

7 - TRIPS Agreement, Annex 1C, Section 3, Article 23. It should also be pointed out that wines and spirits do not come under the PDO system in the European Union; the creation of a multilateral register has been obtained from the WTO for these products containing over 7,000 fully protected denominations.

8 - The main members include Argentina, Brazil, Australia, Canada and New Zealand.

These debates do not merely relate to a commercial controversy; they are also imbued with a cultural and ideological (New World/Old Continent) split, which we think it necessary to discuss.

## Geographical Indication and brand name

From the European point of view, protecting food products against imitations and fraud is considered legitimate as part of a strategy to preserve a cultural heritage. The opponents of the system, on the other hand, regard protection as an obstacle to free competition and consider that the law on brand names is sufficient for regulating trade. These two points of view, which refer to the foundations of Roman and Anglo-Saxon law, merit further examination.

The principal argument put forward by the advocates of the liberal approach is that establishing legal protection based on the origin of products does not provide any additional benefit for consumers, who generally do not perceive denominations as elements of origin but as manufacturing processes. Geographical indications thus have no justification whatever, since their benefit for the community as a whole is nil. The only contribution they make is to grant their holders exclusive private rights. They can thus easily be replaced by collective brands referring to an origin. That is why the geographical indication cannot fall within the scope of intellectual property rights. Some American observers consider that Europe's intention to withdraw a number of denominations which are currently generic (such as Feta, Mozzarella, Emmental or Gouda) from the public domain comes close to a strategy to "colonise" food language: "*The beneficiaries of 'strong GIs' for wines and spirits have much broader ambitions to colonise the language of this food group by voiding appropriate limits on these monopoly rights over language, including by bringing 'traditional expressions' within the ambit of strong GI protection*" (Gallagher, 2002).

From this point of view, the protectionist nature of GIs is a pretext for boosting the economic performance of the European businesses concerned in relation to their competitors, who would suffer considerable economic damage if regulations were introduced. The sometimes flimsy links between certain European PDOs or PGIs and their production area merely add to suspicions concerning GIs.

The advocates of geographical indications consider for their part that the legitimacy of this type of system can on no account be a matter of consumer perception, since consumers are often poorly informed.<sup>9</sup> GIs are not only commercial instruments; they are also intended to play a role in maintaining economic activities in difficult regions. The benefits for consumers are nonetheless important since guarantees of origin and quality are undoubtedly a factor of information. The losses that imitated producers suffer nowadays in connection with usurpation are not only economic but also concern

---

9 - The reader is invited to consult the article published by J. Chen on this subject in *Revue de Droit Rural* (n°. 249) and L. Lorcellec's reply, which was published in the same issue.

the image and reputation of products, particularly when the imitations prove to be of lesser quality. These producers thus deplore the fact that geographical indications have less impact than brand names, which are based on a registration logic according to the “first in time, first in right” principle.<sup>10</sup>

The challenge is thus to define the status of geographical indications in relation to brands. The negotiators, particularly the Europeans, are now considering two possible strategies:

- Extending the TRIPS agreements to all products: This possibility is supported by some 30 out of 140 countries at the present time, but opposition is gathering momentum. It should be pointed out that negotiations are difficult due to the fact that the United States has very few products to protect and the European Union has nothing to propose “in exchange” for TRIPS extension.
- Shortlisting products which would enjoy absolute protection: It would basically be easy to get countries to accept this list because it would be part of the agricultural component and would no longer come under intellectual property rights, so that trade-offs would be conceivable.

Although these two approaches are not incompatible, they are based on very different logics. In the first case, the geographical indications would in principle be promoted in the same way as marks and would thus enjoy equivalent rights. In the second case, the protection of products would be considered to come under a specific system separate from that of competition on a par with cultural or agricultural exceptions. The complexity of the debates is due in part to this nuance.

We would underline, however, that in the various negotiations which succeeded one another in the course of the Millennium Round (Cancun in 2002, Doha in 2003 and Hong Kong in 2005) there was never an opportunity to tackle the issue of geographical indications, for this broader issue seems to be largely secondary to agricultural negotiations (export support, tariff barriers, internal market support). Similarly, agriculture as a whole carries little weight compared to other sectors (industry, technology, services). The importance of geographical indications must therefore be seen in perspective and one must bear in mind that they could only serve as a “bargaining chip” in the context of a broader debate.

Be that as it may, this international perspective shows clearly that recognition of the principle of geographical indication is a *sine qua non* for the medium and long-term sustainability of industries producing origin-labelled products. Such recognition requires that special attention be devoted to product typicality, which is the foundation of the principle of origin. However, the above analysis reveals the need for the contribution made by geographical indications in development terms to be highlighted as a legitimacy argument in its own right.

---

<sup>10</sup> - Similar to the “first come, first served” principle.

## The regional dimension of the industries as a legitimacy argument for designations of origin

Although it is essential to establish causal relationships between the quality of a product and the characteristics of the area where it is manufactured in order to justify the principle of origin, this logic of a link with the local area does not suffice for justifying legal protection through official quality marks. In our opinion the recognition of Feta as a PDO for the benefit of Greece corroborates this argument. The Feta designation was obtained in 2002 and has met with strong protest from many countries throughout the world but also in Europe, including Germany, Denmark and France, three major producers of this type of cheese whose denomination had until then been generic. In France, the production of Feta cheese is the main source of diversification for industrialists in the Roquefort region and it accounts for a large share of the value added to ewe's milk for producers. If producers were unable to use this denomination, the industry would suffer considerable damage, as would the economy of the region as a whole. Producers are all the more against this measure because the specifications do not contain any particular constraint, since the production zone corresponds to the entire territory of Greece. Despite the fact that Feta cheese is undoubtedly part of the Greek heritage, the fact that Greece has obtained the PDO inevitably involves the credibility of the European Union with regard to its trading partners, since accusations of protectionism can seem justified. This latent inadequacy of the "typicality" argument prompts us to include the quality industries' contribution to regional development in the debate.

A marked trend observed at the present time is that regional concerns are emerging and developing in agricultural and agro-food activities. The far-reaching changes that have come about in agriculture in France in the past 40 years have resulted in particular in an increase in regional disparities between areas with considerable production capacities and marginalised zones. As the result of this process combined with the evolution of consumer expectations concerning quality products, the focus of agricultural policies has been changing since the beginning of the 1990s from support for farmers towards a more regional approach. The Regional Farming Contracts (CTEs), which have since been replaced by the Sustainable Farming Contracts (CADs), symbolise the institutional recognition of the new concept of the multifunctionality of agriculture. These new regulations are based on a new conception of development dynamics and raise the question of the functions of agriculture, whose purpose is no longer simply to produce and process raw materials but also to play a role in problems of employment, food quality, tourism and environmental protection. In this new context, added value and the maintaining of economic activities are non-commercial functions of the agro-food industries. Regional development can thus be recognised as a service in its own right that is provided by agriculture. This argument is in line with the viewpoint expressed by J. Nefussi, who refers in this context to the new status of these industries, which have to add value to their products by providing services that meet their clients' expectations (regarding quality, regularity, and lead time). The emergence of multi-

functionality is a phenomenon of the “tertiarisation” of agriculture, a process compounding agricultural industrialisation, which began in the early 1950s (Nefussi, 2000).

Development is more than a potential new function for quality industries producing origin-label products; it is an explicit part of their mission, as was seen in the introduction to this chapter. The “regionalisation” of these industries also comes from the fact that society is making constantly increasing demands on them. Seen first as a gastronomic guarantee, quality marks have come to be regarded as area management tools in their own right. Referring to the advent of post-modern society, L. Bérard and P. Marchenay underline the renewed interest in these products, which at the same time are being reappropriated by various spheres of society – the economic and political sectors, tourism, and heritage management (Bérard, Marchenay, 2004). Quality industries – particularly RDOs – are being included in these spheres through the establishment of links between producers and the other actors in the region: “*The RDO is conceived as a factor of regional differentiation and is thus claimed by a large number of actors in a variety of ways, depending on objectives:*

- *local councillors anxious to develop their region, particularly in the case of fragile rural areas with economic or demographic problems;*
- *development agents and bodies (local feature areas, regional nature reserves, etc), which approach the RDO authority with a view to promoting local assets;*
- *farmers’ organisations, which are concerned by the renewal issue and want to encourage the younger generation to take up farming; the RDO can thus help to enhance the attractiveness of a production area (a potentially higher price for milk);*
- *tourism operators who are involved in promoting RDOs locally (events, visits to farms, etc.) and seek factors for differentiating the region; in this case products broaden the range of local tourist attractions and the local population can play the role of ‘ambassador’ of products in relations with tourists. The RDO thus becomes a vector of identity involved in social cohesion.” (Frayssignes, 2005)*

Research efforts thus focus on building up methodological tools with which this regional inclusion of industries manufacturing origin-labelled products can be measured. And indeed the term “inclusion” is preferred to that of “impact” (economic, social or other). For addressing an issue on the basis of impact requires using means – particularly statistical means – which are not suited to the work involved in the present survey. As will be seen, the methodological difficulties caused by such an approach make it difficult to extract relevant results. Furthermore, agriculturalists are constantly seeking decision-making tools that will enable them to adopt a multifunctional approach. Since the concept is still vague, insight is needed which an approach in terms of impact alone cannot bring.

Our approach thus focuses on the ways in which RDOs contribute to development. The aim is to propose objective results that can be compared; development as construed in this context presupposes an approach geared to quality, even if statistics are used. Given

the many different facets of the regional development process, we construe the RDO in three different ways: as an economic activity, as a heritage, and as a system of actors. We shall reply to the question raised in this chapter from these three perspectives.

## The three facets of the RDO with regard to development issues

Amongst the many publications on the contribution quality marks make to development<sup>11</sup> we focus in particular on an idea put forward by the “DOLPHINS” network.<sup>12</sup> In order to illustrate the complexity of the process, E. Stucki and S. Boisseaux propose the “figure of 8” based on the following hypotheses:

- the region gives a product its typicality,
- that typicality is recognised by society (markets, regulations),
- society remunerates producers in consequence,
- producers allocate part of their income to renewing regional resources and contribute to development (Boisseaux, Stucki, 2001).

Our approach is based on the fourth hypothesis: how can the contribution made by producers – and thus by a product – to the regional development process be analysed? Far from being solely financial, this contribution takes many different forms, and we therefore examine the origin-labelled product from three aspects in turn – as an economic activity, as a heritage and as a system of actors.

Analysis<sup>11</sup> of the economic activity generated by the presence of an RDO industry implicitly refers to the broader issue of employment. The first task is thus to evaluate the number of actors involved in the industry, both upstream (producers) and downstream (jobs in processing firms). These figures must then be compared with broader data (designation area, administrative region, etc.). However, since an analysis of this nature is relatively static we have opted for a more dynamic approach based on the process of building up specific production resources. The presence of agricultural and agro-food activities in a region implies needs in terms of technical and technological skills (suppliers, service providers, training, research & development, technical support, and so on). Although these services are all activities that are created, they also themselves generate resources (skills, know-how, etc.), which in turn bring development. Since the RDO is based on the principle of non-reproducibility, these resources can become specific. Several questions can explain this conception of regional development: has the presence of a designation induced the emergence of a specific production fabric that would be difficult to reproduce elsewhere? Can the content of the specifications give rise over time to a pole of skills based on a particular activity?

11 - The reader is referred here to the following works cited in the bibliography: Lagrange (1999), Briand (1999), Coutre-Picard (1999), Berriet-Sollic, Daucé, Léon, Schmitt (2000), Olivier (2003).

12 - *Development of Origin Labelled Products, Humanity, Innovations and Sustainability*, network of European researchers working on quality products; see [www.origin-food.org](http://www.origin-food.org) for further information.



The resources referred to in this first approach are exclusively production-oriented. The multisectoral nature of development requires examining other types of resources that are built up on the basis of synergies between various sectors of activity in a particular region. The RDO conceived as a heritage is part of this approach, where one examines whether an origin-labelled product helps to qualify the region – by becoming a tourist attraction, for example. Regional development lies here in the ability of designations to build up or become part of what some economists call “baskets of goods” – series of products and services which, being located in the same region, are mutually supportive and are such that tourists and consumers are willing to pay for them (Mollard, 2001; Pecqueur, 2001). Actions such as “tours” devoted to an RDO product, which detail what a region has to offer, are to be classed in this category.

This qualification process inevitably involves coordinating various actors in the context of collective action (professionals from the industries, local councillors, tourism actors, etc). Similar to building up (production or heritage) resources, this coordination is also a core element in the regional development process. The third component of our approach is thus the inclusion of RDOs in forms of regionalised coordination (whether private, public or semi-public).

Since this methodology can be applied to all quality marks, and indeed to all origin-related products, various rosters can be elaborated for assessing the role played by an RDO in the development process. The Roquefort example, which is used in the second part of this chapter, will thus illustrate the many different ways in which an industry contributes to regional dynamics; particular attention will thereby be devoted to the scales of these processes.

## The Roquefort RDO in regional development dynamics

The Roquefort RDO (located mainly in the south of the French department of Aveyron), which we have chosen as a concrete example, has several major characteristics which distinguish it quite clearly from the other cheese sectors with designations of origin. It is all the more important to point out these specific features since they play a significant role in the development of the region. The various contributions made by the industry to the regional development process can then be examined:

- evaluation of its economic significance in terms of farms and industrial jobs in processing firms,
- its ability to stabilise activities over a longer period as the result of the legal protection of the product,
- the benefits brought by the RDO to the production area (price of milk, attractiveness, boosting of the image of farming as a profession, negotiations with distributors, etc.),



- the propensity of the RDO to generate a specific production fabric bringing together a large number of structures and bodies and making the Roquefort area the global technical reference in matters of sheep farming,
- the role played by the RDO in the strategies pursued by councillors and tourism professionals to develop the region.

## The Roquefort industry

The Roquefort label was obtained in 1925 and is the oldest cheese designation in France; it is structured around an organisation which was created in 1930: the Confédération Générale des Producteurs de Lait de Brebis et des Industriels de Roquefort (General Confederation of Ewe's Milk Producers and Industrialists of Roquefort),<sup>13</sup> which has brought together all of the actors involved in the industry (milk producers and processors) ever since. In addition to its status as an RDO syndicate, the Confederation operates as an inter-trade organisation devoted to managing the entire ewe's milk production process in the region. The RDO cheese actually accounts for just over half of the volume of milk produced, the remainder being processed into other types of product (Feta, pressed cheeses, powdered milk, etc). This situation is explained by the strategy formerly pursued by the industrialists in the region, who had to cope with surplus production from the 1970s onwards. The inter-trade structure of the industry makes Roquefort a relatively autonomous organisation with virtually no equivalent in France, where a complex system for limiting production was introduced in 1987 similar to the quotas for cow's milk in conjunction with an equally original milk payment mechanism.<sup>14</sup> Despite the countless conflicting interests amongst the actors involved (in particular with regard to the fixing of milk prices), the Confederation is still the main institutional framework within which decisions on the management of ewe's milk in the region are taken. The early establishment and the durability of this body are thus features which must be underlined.

Roquefort output in 2005 was approximately 19,000 tonnes (see Table 1), i.e. the third leading trade name after Comté and Cantal. It must be pointed out here that output is very stable – it amounted to 19,800 tonnes in 1991. The Roquefort market thus seems to have reached maturity, with little variation, similar to the RDOs produced in large volumes. There are currently seven firms which collect the milk from 2,350 delivery points (individual producers or collective farming groupings). The Lactalis group has a majority interest in the main brand name, Société, which accounts for almost two-thirds of the total volume manufactured. The remaining third is produced by three cheese plants operating on a regional scale (one of which, SCARO, is a cooperative) and

13 - Referred to hereafter simply as the Roquefort Confederation.

14 - In view of the tremendous increase in output resulting from the technical efforts made, the directors of the Confederation decided to react by allocating an Individual Reference Volume to each producer, which was calculated on the basis of the previous four farm years. At the same time, it was decided that the rules for milk payment would be based on three price grades: "grade 1" milk was intended for manufacturing Roquefort cheese (high remuneration), "grade 2" milk concerned diversification products including Feta cheese – and output developed considerably – , and "grade 3" milk was sold in bulk or as powdered milk

three smaller firms. The designation area, which was recently revised,<sup>15</sup> now corresponds to the actual ewe's milk production area also known as the "Roquefort Area". It extends over six departments and two administrative regions: Aveyron, Tarn (Midi-Pyrénées), Lozère, Hérault, Gard and Aude (Languedoc-Roussillon, Map 1 below).

**Table 1 - ID file of the Roquefort PDO industry**

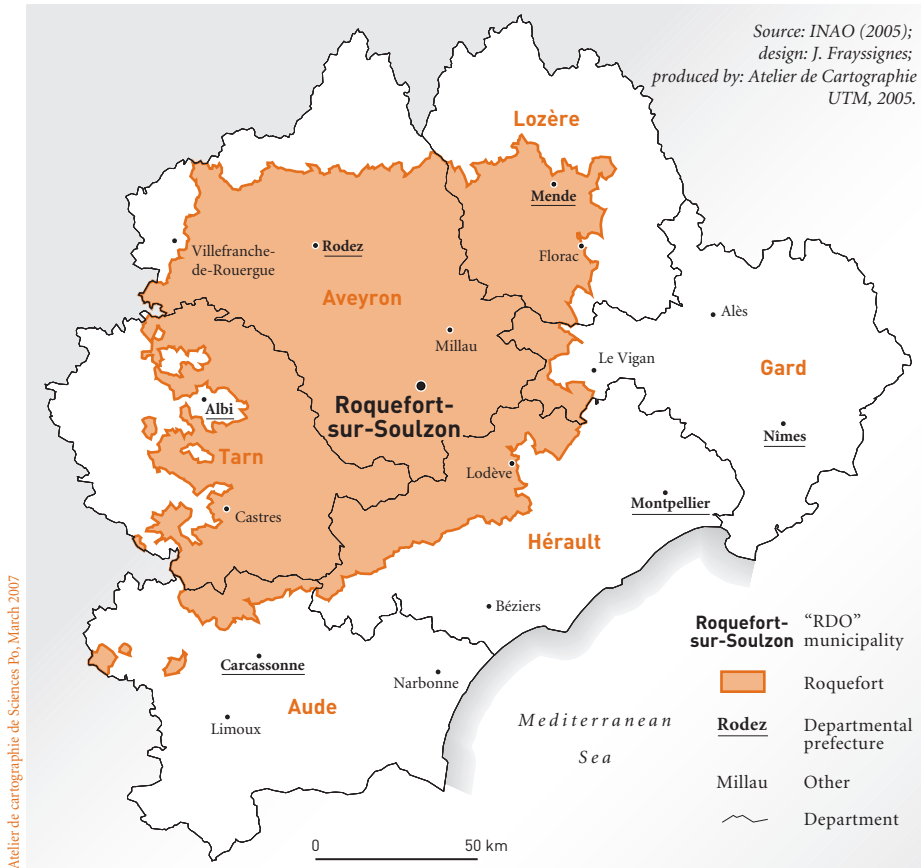
Denomination	Roquefort
Technology	Blue-veined cheese
Type of milk	Ewe's milk
Content of specifications	Raw milk from the designation area, grass-based feed system (silage tolerated), ripening in the Roquefort cellars
Location of the RDO area	Aveyron, Tarn, Lozère, Gard, Hérault and Aude
Date on which the RDO was obtained	26 July 1925
Overall milk output (in litres)	180 million
Milk ewes	800,000
Output 2005 (in tonnes)	19,100
Trend in absolute figures 1991-2005	- 828
Trend 1991-2005 (%)	- 3.5%
Number of milk producers	2,358
Number of processors	7
Principal actors	Lactalis, Papillon, SCARO
Principal brands	Société, Papillon, private brands
Marketing channels	86% in large and medium-sized chain stores
Exports (in tonnes)	3,540
Management body	Confédération Générale des producteurs de lait de brebis et des industriels de Roquefort (Roquefort Confederation)

Source: INAO, CNIEL, Roquefort Confederation, 2005.

The Roquefort RDO area is part of "Vacuum France", which was highlighted by geographer R. Béteille (Béteille, 1981) as a region of considerable demographic fragility. The south of the Department of Aveyron and the east of the department of Tarn are still declining, despite the fact that the figures for the 2003-2005 period show that the trend is slowing down (net migration is now positive). Millau District, for instance, has very low population density: just under 20 inhabitants per km<sup>2</sup>, and over 50% of the municipalities have a density of less than 10 inhabitants/km<sup>2</sup>. This fragility is also economic in that the Roquefort industry is the main pole of activity in this region. This situation where there is no alternative activity partly explains the decisive economic importance of the RDO for its region.

15 - Decree of 17 May 2005 amending the "Roquefort" registered designation of origin.

Map 1 - Roquefort designation area



## Significant economic importance

The overwhelming majority of processing plants in Roquefort and elsewhere have diversified their activities and manufacture both RDO and non-RDO products. It can thus sometimes seem to be an exaggeration to consider that all of the jobs in a given firm are to be attributed to a designation. We consider that our approach is relevant in the case of Roquefort, however, since the RDO is always the flagship product of the firms involved and therefore justifies the manufacture of other products, which probably would not exist in other circumstances. Realities in the field must also be approached with caution where milk producers are concerned, for all of the businesses have raw material potential that is always greater than the volume actually processed into the RDO product. Some producers whose milk is processed into alternative products could therefore be classed in categories other than the RDO category, but we have nevertheless opted to keep them in this category since all sheep farmers in the industry meet the specifications and receive specific remuneration.

The number of dairy farms and industrial jobs was then compared to broader data (RDO area) in order to assess the economic significance of the designation in relation to overall agricultural and agro-food activity. The data collected on farmers come from the General Agricultural Census (GAC) and have been cross-checked against local and regional data. The information on industrial jobs comes from the economic statistics of the INSEE<sup>16</sup> (SIRENE Directory, a database dedicated to businesses and establishments<sup>17</sup>). It should be noted that for practical reasons the comparison region for these jobs is not the RDO area but the Midi-Pyrénées administrative region, since the data is only available at that level. The results are nevertheless relevant, since all of the processing plants are located in the region with the exception of one cheese plant in Lozère.

One of the principal limitations of this work lies in the discrepancies between the data: year 2000 for the GAC, 2005 for the RDO data, and 2002 for the INSEE statistics. Since this mismatching is insurmountable for the time being, we can merely presume that there is little variation in the figures from one year to the next so that the results are not significantly altered. The figures presented are thus only to be considered as orders of magnitude, but they nevertheless seem reliable, since we were able to check and refine them by means of interviews held in the field (see Tables 2 and 3).

Ewe's milk production is specific to the Roquefort region; all of the farmers involved in the activity deliver their milk to the Roquefort industries. In fact this region is the leading ewe's milk production region in France, surpassing by far the Basque Country and Corsica with almost 40% of sheep farms. It should be pointed out in conclusion that despite its specific nature sheep farming is still significant in the agriculture of the region as a whole, accounting for 12% of the total number of farms. This figure may seem low, but it is in fact relatively high compared to other regions where milk RDOs are much less significant compared to agricultural activities as a whole (4.9% in Lower Normandy and 3.7% in the Central Region).

As regards the milk-processing subsector of the agro-food industry, the jobs connected with the Roquefort RDO account for a considerable percentage of employment in the region – almost 50%. When one examines the agro-food sector as a whole, Roquefort still accounts for 8% of jobs; this is still a high percentage when compared to the other regions studied in the thesis.<sup>18</sup> The Roquefort industry carries marginal weight compared to employment in industry, but this is similar to the significance of the agro-food sector in industrialised countries as a whole. When one reduces the field of comparison to the two departments where the cheese plants are located (Aveyron and Lozère), RDO jobs nevertheless account for over a one-third of agro-food jobs, and still almost 10% of jobs in industry.

---

<sup>16</sup> - National Institute of Statistics and Economic Research.

<sup>17</sup> - See website: [www.sirene.tm.fr](http://www.sirene.tm.fr).

<sup>18</sup> - Lower Normandy: 5.1% of jobs; Centre: 2.6% and Savoy + Upper Savoy: 2.2%.

**Table 2 - Significance of the Roquefort industry Farms, 2005**

	Roquefort industry
Farms (2005)	2,358
Sheep farmers in the RDO zone <sup>(19)</sup>	2,358
% RDO farms / sheep farms in RDO zone	100 %
Total no. of farms in RDO zone	19,370
% RDO farms / total no. of farms in RDO zone	12.17 %

Source: Surveys carried out by author (2003-2004), INAO data (2005), GAC (2000), INSEE (2002-2003).

**Table 3 - Economic importance of the Roquefort industrial jobs, 2005**

	Roquefort industry
RDO agro-food jobs	1,829
Jobs in the regional milk industry	3,888
% RDO jobs / jobs in the regional milk industry	47 %
Jobs in the regional agro-food industry	23,000
% RDO jobs / jobs in the regional agro-food industry	7.96 %
Regional industrial jobs	154,000
% RDO jobs / regional industrial jobs	1.19 %

Source: Surveys carried out by author (2003-2004), INAO data (2005), GAC (2000), INSEE (2002-2003) and UNEDIC (2002).

In an article published on this subject in *Midi Libre* in 1977, journalist S. Guiraud considered that the Roquefort industry concerned a workforce of approximately 10,000 people (Guiraud, 1997). The destiny of this region thus seems to be very closely linked to the sound economic health of the industry. Although RDO industries of scale such as the Comté, Cantal or Reblochon cheese industries can claim an equivalent or even larger number of direct and indirect jobs, they do so in a much more diversified regional economy: nowhere else is the destiny of a region so closely linked to that of one single product.

The figures presented above give an idea of the economic importance of the Roquefort industry. Since they are above all the result of a course of production and institutional setup peculiar to the designation, we consider it important to discuss the historical processes which led to the protection of the Roquefort denomination in greater detail as well as their impact in terms of spatial stabilisation of the activity.

19 - The term "RDO zone" designates the region covered by the entire RDO area. It denotes a potential number of farms.

## The ability to stabilise economic activity

Legally, RDO cheeses can be classed in two main categories. Some designations actually have the distinctive feature of coexisting with a generic product – i.e. one which is not protected – with a very similar name. This is the case with the Crottin de Chavignol and Sainte-Maure de Touraine cheeses (the terms “crottin” and “sainte-maure” being generic) and with Camembert de Normandie, which coexists with two other denominations (generic): camembert and “Camembert made in Normandy” (semi-generic, reserved to Upper and Lower Normandy). These three designations thus have to contend with direct competitors operating within the RDO areas.<sup>20</sup> In contrast with these “partial protections”, other designations can be regarded as providing “full” protection, since they prevent any development of a generic product in principle. These denominations are unique and indivisible, referring to one single product and only that product. Reblochon, Beaufort and, of course, Roquefort are examples of full protection. This distinction seems to be decisive for the impact of an RDO on a region, although it is not always easy to determine how this impact is achieved. Further examination of the history of the protection of Roquefort cheese can cast light on the subject.

The history of the Roquefort designation of origin is in fact first of all the history of a struggle to eliminate what was regarded as fraud and unfair competition in the region. Although sheep farming is an age-old activity, frequent crises occurring in the period from 1910 to 1920 (sharp decreases in the price of milk) prompted producers to group in local unions and then in a regional federation, the FRSEB,<sup>21</sup> which was founded in 1922. In addition to defending their interests, farmers were also aiming to sell their milk to industrialists in the best possible conditions, to improve farms and to have a structure providing information and technical and economic support. The industrialists were grouped in two structures at the time – the Syndicat Aveyronnais (the largest businesses including the Société des Caves) and the Chambre Syndicale (small firms). Since the industrialists were competing with one another in the purchase of milk they decided to regroup in the FSIR<sup>22</sup> in 1928 in order to rationalise milk collection and to step up co-operation moves (exchange of raw material, efforts to seek market outlets, etc). The two federations very soon realised that it would be of advantage to have one single union for regulating their relations and they thus set up the Roquefort Confederation in 1930, which was modelled on the wine-growers’ inter-trade organisations operating in France at that time (particularly in the Champagne area).

The law establishing the designation of origin, which came into force on 26 July 1925, was based entirely on this compromise between farmers and industrialists. Originally, the intention to protect the product was explained by the international notoriety of

20 - Most of the processors involved in the industries concerned “hedge their bets”, manufacturing both products at the same time.

21 - Regional Federation of Sheep Farmers’ Unions; there were over 10,000 sheep farmers in the region at that time.

22 - Federation of Roquefort Industrialists’ Unions; there were almost 40 industrialists at the time, owning over 1,200 dairies.

Roquefort cheese. The purpose was to put an end to practices considered fraudulent in order to protect this reputation: use of cow's milk and ripening in cellars situated outside the municipality of Roquefort-sur-Soulzon (Aveyron). The farmers were not against these measures, but they wanted to take advantage of the law to establish a collection area within which the industrialists would be required to obtain their supplies. For high production costs in France had been prompting industrialists from the end of the 19th century to set up dairies in Maghreb countries, Greece and Eastern Europe. Fearing that they would be excluded from the industry in the long run, the farmers demanded the exclusive right to produce the milk in order to prevent the industrialists from achieving their ultimate goal of freeing themselves from dependence on the region. In the end, the text of the act included the requirements of both parties. The limestone plateau of Causse de Combalou, where the municipality of Roquefort-sur-Soulzon is situated, was henceforth the only place authorised for ripening the cheese; this excludes what are referred to as "mongrel" cellars located throughout the region. It was further stipulated that the cheese must only be produced with unskimmed, unprocessed ewe's milk. And finally, the industrialists recognised only the Lacaune breed of sheep. The farmers, on the other hand, obtained the limiting of the collection area to metropolitan France. In actual practice the industrialists obtained their supplies in the south of the Department of Aveyron (extended to the bordering departments), in the Department of Pyrénées Atlantiques and in Corsica.

This significant episode in the development of the industry proved decisive in the evolution of the Roquefort designation and thus of the region as a whole. The law passed in 1925 had considerable spatial impact – its repercussions are still felt today. Whereas at the time the intention was to remove any cheese produced with cow's milk and/or ripened in a cellar other than in Roquefort, the law and the various decrees which followed now constitute a veritable rampart against any relocation. What is more, in addition to a collection area the Roquefort RDO has the further particularity of being structured around a ripening area that is limited to the municipality of Roquefort-sur-Soulzon. Thus, where other RDO areas have allowed certain phases of the production process, in particular the conditioning phase, to move further afield, Roquefort is a good example of the spatial stabilisation of an economic activity, as is shown by the following account: *“Roquefort’s major strong point is the regulatory framework. The cellars are a very small sector, and then there’s the storage and conditioning in the municipality. For if storage and conditioning within the municipality had not been made compulsory these production phases would have gone elsewhere. It would be the same problem for all of the industrialists involved. The strength of the RDO is that it retains a maximum of the value added to the product. This means that all of the profit is retained in the region. Otherwise everything would have gone elsewhere.”*<sup>23</sup>

It is thus extremely interesting to see that an RDO's ability to stabilise an activity in a region is directly related to the propensity of the actors involved to obtain full

---

23 - A ewe's milk producer.

protection for their products whenever they obtain the designation. The examples cited above (Camembert de Normandie, Crottin de Chavignol, Sainte-Maure de Touraine) illustrate situations where the actors involved at the time did not have the will – or did not carry sufficient weight – to prove that their approach was justified and that their product was specific. Indeed it is revealing to observe that the five RDO cheeses in France with the largest output (Comté, Roquefort, Reblochon, Cantal and Saint-Nectaire<sup>24</sup>) all enjoy full protection. Other things being equal, the full protection of a designation undoubtedly generates a much higher level of activity than that generated by partial protection, a fact which of course is fundamental from the point of view of agricultural development. There is no doubt that RDOs such as “Reblochon de Savoie”, “Comté du Jura” or “Roquefort d’Aveyron”, for example, would not have the same impact today in terms of economic activity. Conversely, cheeses with designations referring to specific regions (Camembert de Normandie, Sainte-Maure de Touraine, Brie de Meaux, Brie de Melun) or types of product (Crottin de Chavignol, Tome des Bauges, Bleu d’Auvergne, Fourme d’Ambert) would be produced on a very different scale if they had enjoyed full protection.<sup>25</sup>

It can be stated in conclusion that over and above competition phenomena the definition of products is of crucial importance in the current economic context, which is marked by the relocation of activities to Eastern European countries. Agriculture, and especially milk production, is also affected by this problem, particularly in relation to emerging countries such as Poland, which is characterised by a high level of agricultural activities, although they are still fragmented and the sector still lags behind in the technical and sanitary field. In this context, the RDO is obviously an unquestionable rampart against these relocations.

The diachronic perspective of product protection illustrates the role an RDO can play as an institutional tool for stabilising the activity and employment. The Roquefort RDO is a typical example of these issues. The spatial impact of a designation cannot be reduced to this one aspect alone, however. The dynamics inherent in the structuring of production areas (price of milk, mobility of farms and processing plants) is another facet of the problem which merits examination.

## Benefits for production areas

The purpose of RDOs is to maintain the agricultural and rural fabric, and this inevitably involves creating production areas that are attractive both for farms and for processing firms. This attractiveness can be measured on the basis of various criteria, one of the main factors being that of enhancing the value of the raw material. A necessary preliminary to identifying the benefits brought by an RDO is thus to analyse the price

24 - i.e. almost 60% of the volume of RDO cheeses manufactured in France in 2005.

25 - To quote an example, the national camembert output (all forms of camembert) was 135,000 tonnes in 2005 (13,000 tonnes in the case of the RDO Camembert de Normandie and 85,000 tonnes in the case of Camembert “made in Normandy”, the remainder being generic camembert manufactured all over France).



of ewe's milk in the Roquefort area (as well as its consequences). The mobility of the actors involved within that area must then be examined, particularly in terms of the designation's propensity to curb restructuring phenomena. And finally, insight into the practices and perceptions of the actors in both the agro-support and downstream industries will complete this section on the attractiveness of production areas.

The producer price of milk is a fundamental factor for the actors involved in cheese designations through which they can evaluate and sometimes compare the economic performance of RDO industries. Surveys conducted at the national level show that, on the whole, milk that is processed into an RDO product is 20% more expensive on average than "standard" milk: 357 for 1,000 litres of milk for RDOs; 298 for standard milk (Uguet, 2003). Of course, these overall values conceal very marked regional disparities. The Savoy designations (particularly Beaufort and Reblochon) are traditionally in the lead, with prices ranging from 431 to 539 for 1000 litres (2.82 to 3.53 francs/litre). Lower Normandy designations are in the mid range (317 for 1000 litres, i.e. 2.10 francs/litre), the products with the least added value being cheeses from the Massif Central (300 for 1,000 litres, i.e. 1.96 francs/litre).

Given the significance of ewe's milk production at the national level, there is no real point of comparison between the milk processed by Roquefort industrialists and standard ewe's milk. The original payment system set up by the Roquefort Confederation, which we mentioned in the introduction to this chapter (see above), makes a distinction between the various products processed. Milk processed into Roquefort cheese (grade 1) fetched 1,047 for 1,000 litres in 2004 (i.e. 6.87 francs/litre). The average price (all grades together) was around 820 for 1,000 litres the same year (5.36 francs/litre). The remarkable stability of this addition of value over time must be underlined here – in 1995 the average price was 817 for 1,000 litres (5.38 francs/litre). The system established in Roquefort, which is often cited as an example of a good match between the value added to the raw material and the value added to the finished product, enables milk producers to earn a fairly good income, which means that they have greater investment capacity. Furthermore, the high price of milk does not adversely affect the quality of the milk<sup>26</sup> as has been observed in other milk-producing regions, since a further feature of the industry is that animal husbandry techniques (flock management, artificial insemination, milk testing and output recording, genetic selection, feeding) are widely applied in the production area. We would point out in conclusion that the attractiveness of the industry is to be explained at least as much by the fact that it is an inter-trade activity as by the high level of value added to the milk. In the 1990s, several sheep farmers with lower output levels were requested by dairies in the Massif Central to produce ewe's milk organically and were given to understand that they would earn higher incomes. However, in view of the difficulties connected with converting to organic farming and with a low-profit market, these producers very soon applied for

---

26 - The case of Savoy and Upper Savoy can be cited, where technicians explain that the very high value added to cow's milk has repercussions on the farming practices of certain dairy farmers (small herds, traditional farms), for whom it is more difficult to question their farming methods from the technological point of view.

reintegration into the inter-trade system: “*We farmers defended them against the industrialists, who did not want to take them back – we’d given them three years, because we felt that they were making a mistake. I think the system is a good guarantee the way it is set up, because it is close to market realities.*”<sup>27</sup>

Thus, in terms of added value the Roquefort area is attractive, particularly compared with other animal farming industries in the region, even if the future prospects are to some extent uncertain, particularly with regard to farm renewal and labour.

As regards the mobility of actors within the designation areas, it has been observed in other regions (Centre, Lower Normandy, Savoy and Upper Savoy) that the overlap of RDO areas has often given rise to the relocation of processing plants and has affected farmers’ commodity specialisation and even their decision to go into farming. The Roquefort example further highlights “non-mobility”, i.e. a propensity, particularly on the part of farmers, to preserve what has been achieved and to curb restructuring phenomena. Due to the particularly fragile demographic context in the region, the question of the maintenance of farming activities and producer renewal is particularly acute. The natural consequence of the considerable technical efforts made by the actors in the industry from the 1960s onwards has been an increase in the volume of milk collected, the number of ewes raised and the size of farms. Conversely, the number of farmers and processing firms has been steadily dropping since that date; Table 4 summarises that trend.

**Table 4 - Development of the Roquefort industry since 1950**

Year	Total volume collected (millions litres)	No. of milk ewes	Average annual quantity delivered per farm (hl)	Number of dairies	Number of producers
1951	33.2	480,000	32	690	13,204
1961	38.9	450,000	49	345	8,010
1971	39.2	440,000	79	250	4,950
1981	76.1	700,000	219	212	3,475
1988	117.7	740,000	384	43	3,063
2004	180	800,000	777	10	2,358

Source: Confédération de Roquefort, 2004.

One observes that production has restructured to a considerable extent, with a drop of over 80% in numbers in 50 years, a depletion which obviously raises questions with regard to land use. However, attention must be devoted at the same time to the trend in production over the last 10 years. The number of farmers actually dropped from 2,550 to 2,315 between 1996 and 2004 – a decrease of 10.1%. This figure must be compared (proportionately) with that of the national milk production sector, which lost

27 - A ewe’s milk producer in the Roquefort region.

almost one-third of its workforce during the same period (numbers dropping from 140,000 to 96,000). The very high degree of restructuring that has taken place in the Roquefort area thus seems to have helped to strengthen the viability of the structures that are still operating today. This durability – strengthened by the overwhelming proportion of professional farmers (99%) – makes Roquefort an industry which is in principle better prepared for future trends than are the other production areas (Savoy, Upper Savoy, Lower Normandy), where there is liable to be a considerable decrease in the workforce in the years that lie ahead.

The practices and perceptions of the actors in the industries – both farmers and processors – form the last chapter of the analysis of the attractiveness of RDO production areas.

With regard to animal husbandry, a specific feature of milk production compared to other agricultural activities is that farmers generally have to contend with greater constraints. The great majority of farmers do not consider their work to be more difficult (modernisation having greatly lightened the work load), but milking requires daily presence throughout the year. This question of working time is one of the growing concerns of the profession in view of the widening gap between agriculture and the current aspirations of society (the place of work, the desire to have free time, leisure activities, etc.). In this context, many dairy farmers consider that their style of life is at odds with these aspirations. The wide media coverage of the introduction of the 35-week has accentuated these feelings. It is the farming profession that is threatened in the long run, since constraints can discourage people from going into farming and curb withdrawals, which are relatively frequent in the milk production sector. The reform of the CAP (Common Agricultural Policy), which began in 2003, has aggravated the situation in an already fragile milk sector. The logic based on the decoupling of aids<sup>28</sup> is in fact very difficult for farmers to accept, since they consider that this system strengthens the logic of state support in a context where the price of milk is still their main source of income.

Given these particular circumstances, the benefits related to the presence of an RDO do not concern a potentially higher income alone. Many producers are well aware of participating in the elaboration of a specific product with positive values (tradition, authenticity, quality, etc.). Thus, when they are a proud of their farmer status this can compensate at least in part for the above-mentioned constraints, even if remuneration is the most important factor motivating actors.

And Roquefort has of course this capacity to boost the image of farming as a profession. Furthermore, the presence of the designation – combined with the revision of the specifications and area between 2001 and 2005 – has helped to boost milk producer involvement in the industry. For despite the constraints involved, the introduction of new rules on sheep feeding (limitation of silage and concentrates and the introduction of a minimum quantity of grass) was an opportunity for producers to reappropriate a

---

28 - The payment of producers now only depends in part on the quantities produced.

product which had long remained the prerogative of processors, who often considered that the quality of the product was first and foremost their doing, since milk was merely a basic raw material.<sup>29</sup> The idea underlying the revision of the designation area was very similar. The present area (see Map 1) follows a zone which extended throughout the south of France (21 departments, from Alpes Maritimes to Gironde) having been inherited from a period when milk needs were very great and technical equipment on farms was mediocre.<sup>30</sup> This trend towards reappropriation, which is also observed in other RDO industries (Lower Normandy, Centre), is undoubtedly a guarantee of sustainability for the future. In an activity where milk producers are generally the professional group least involved since they are not directly connected with the market, the fact that designations of origin operate as industries is undoubtedly a feature specific to this branch.

Whereas feelings of pride also concern the downstream part of the industries, the benefits of RDOs for processors are also measured commercially. Statistics show that the years following the obtaining of a designation are generally marked by a growth in output. Table 5, which covers the 1990-2004 period, illustrates this phenomenon.<sup>31</sup>

These figures confirm that there is a specific demand for origin-labelled cheeses. Once a new RDO has been obtained the product is immediately placed on a level with renowned cheeses such as Comté, Cantal or Roquefort. Distributors thus pay particular attention to RDOs, as the following industrialist remarks: *“Marketing managers in enterprises tell me that they find new markets due to the fact that it’s an RDO. There is demand because it is a new RDO, so there is a demand to have it in the range.”* This special status conferred on the product is not necessarily accompanied by higher value, which is in fact very difficult to measure. A further fundamental feature of RDO cheeses compared to generic or new products is their shelf life: *“When a client revises his assortment he doesn’t change the RDO, because he has to have it in the department. If he needs to make room, it’s the specialty that will be cancelled. So it’s quite a weapon. Consumer surveys show that 85% of new ultra-fresh products don’t survive longer than two years. There are many more unsuccessful products than there are successful ones.”*<sup>32</sup>

In the example with which we are concerned here, Roquefort undoubtedly plays the role of a “sales facilitator”, since it provides an opportunity to “place” other types of product which have no quality mark with distributors and cheesemongers. In the same line of thought, it must be underlined how important it is for processors to have several RDOs in their range in order to distinguish themselves from their competitors and also to facilitate their negotiations with distributors. This strategy is illustrated by the case of the Lactalis group, the biggest industrial milk enterprise in France and is the majority shareholder in the Société des Caves (almost two-thirds of the volume of

29 - Professionals often referred to the Roquefort label as the “ripening RDO”.

30 - The Roquefort industrialists collected milk in the two other major sheep-farming regions in France – Corsica and the Basque Country – until the 1970s.

31 - Other cheeses obtained their designations during the same period but are not included in this table due to lack of data (Chevrotin, Tome des Bauges, etc.) or because their situation is too specific (Fourme d’Ambert and Montbrison).

32 - A manageress in a marketing department in Roquefort.

**Table 5** - Output trends of several cheese industries after obtaining an RDO

RDO output (in tonnes)	Year in which RDO was obtained (n)	n + 1	n + 2	n + 3	n + 4	General trend in absolute figures
Pélardon	3	178	194	207	213	+ 210
Valençay	147	181	202	235	272	+ 125
Bleu du Vercors Sassenage	39	92	106	131	146	+ 107
Époisses	346	392	447	490	642	+ 296
Rocamadour	440	480	546	598	600	+ 160

Source: INAO, 2005.

Roquefort marketed). The group is in fact the leader in cheese RDOs with a range of 23 out of 45 RDO milk products. In the period from 1999 to 2001 all of the departments in the firm were reorganised and the result was the establishment of a special marketing division for origin-labelled products (known as the “RDO division”) based in Roquefort-sur-Soulzon. The purpose of these restructuring measures was also to rationalise the marketing of the group’s RDO products and to negotiate with distributors on the basis of this broader range. This has brought definite benefits to the industry as a whole, particularly as the result of expanded commercial activities.

Analysis of the dynamics operating in production areas thus provides a whole range of relevant quantitative and qualitative indicators for evaluating the contribution of RDOs over and above their economic importance. Our approach presupposes that the viewpoint be broadened beyond agricultural and agro-food spheres, however, with a view to examining other actors in the region. The following two sections thus take another look at the last two presentations of the development process set out above, again on the basis of the Roquefort example:

- the production dimension of development, where we will examine the capacity of RDOs to generate specific production resources (skills, know-how, etc.) on the basis of links established with actors in the fields of training, research & development and technical support;
- development construed in terms of synergies between various activities, whereby tourism tops the list. We shall then discuss the collective dynamics aiming to qualify the region, in particular on the basis of its quality products.

## Affirmation of the production system dedicated to producing ewe’s milk

We shall first discuss the Roquefort production system by examining its main characteristics of density, specialisation and technical advancement. Then, against the background of a fragile demographic context, we shall see how the actors in this system are

endeavouring to use local resources to best advantage. And finally, we shall evaluate the real place of the RDO in this context.

### *The Roquefort area, between density and specialisation*

Milk production is very unevenly distributed over the designation area, certain zones such as Ségala and Lézou (Tarn and Aveyron) being overrepresented to the detriment of the limestone plateaux regions. The vast majority of sheep farmers (some 70%) are located in Aveyron, with only 17% in Tarn. A further factor to be pointed out is the extremely high milk production density in certain local areas. Réquista Canton (Aveyron), for example, has almost twice as many sheep farms as Gard, Hérault and Aude together (204 against 116). The map 2 below shows the distribution of delivery points.

This milk production density provides an extensive fabric of suppliers generating agricultural activities. Although difficult to quantify, this fabric is nevertheless perceived as such by producers: “*We have a choice of feed suppliers, for example – there’s Unicolor, RAGT and Sanders. The whole area is well served – there’s no lack of goods.*” The setup in the milk transport system is similar. Société des Caves does not have any specific transport service, operating solely through contracts with independent service suppliers. The firm now operates with some 50 local transporters ranging from private individuals with a transport permit to professional firms with several vehicles. This feature is specific to the region – in other regions (Lower Normandy, Savoy, Upper Savoy) the Lactalis group operates its own fleet of vehicles. This situation, which dates from the period before the arrival of Lactalis, seems to be continuing for the time being, although the strategy of the group can question the practice at any time and thus disrupt the operation of a number of local firms for which Société des Caves is the main client.

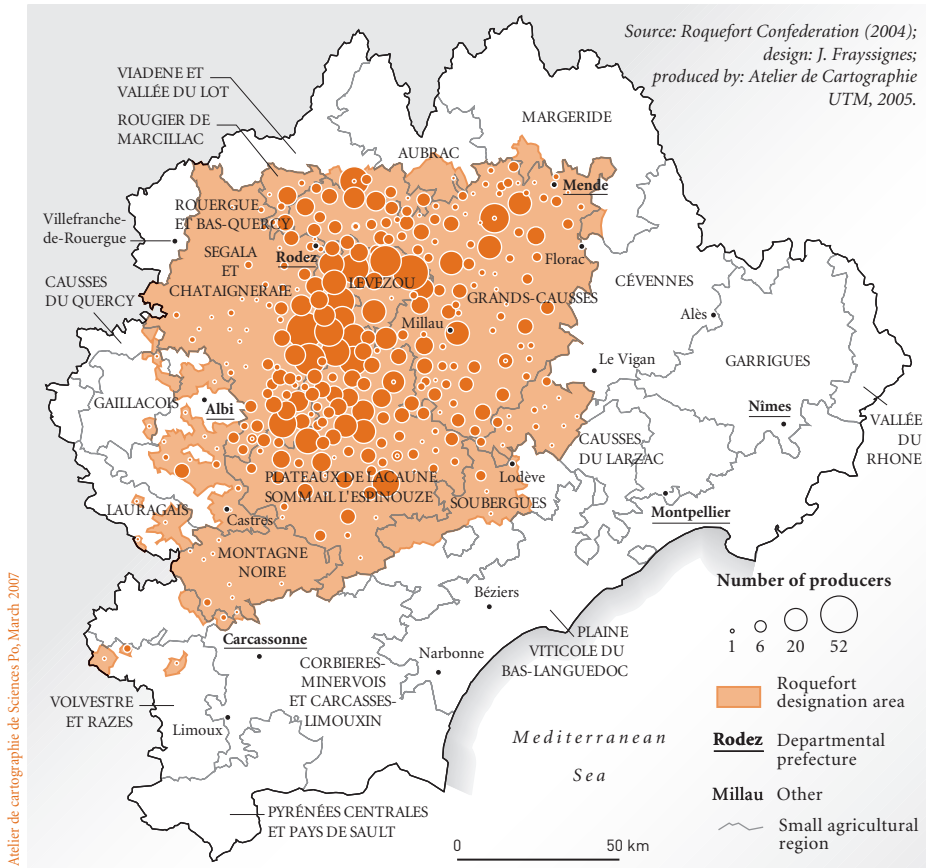
The extent and specificity of the activity have also contributed to the specialisation of training. La Cazotte Agricultural College (in Saint-Affrique) was established in the 1970s to meet the need of professionals in the region for training that was adapted to the local context. This college is the main “supplier” of farmers in the industry. In addition to the classical training courses (BPREA<sup>33</sup>), the college has created a Specialty Certificate known as the “Consultant Technician in Ewe’s Milk Production Certificate”, with which graduates can become dairy technicians and then go into the departments of the Roquefort Confederation or one of the firms. This certificate is the result of close co-operation between actors in the education field and professionals, and it is an appreciable betterment compared to the standard higher vocational training certificate.

We would point out in conclusion that this production fabric is used by the regional authorities as a communication tool which adds to the attractiveness of the region. The Aveyron Departmental Council portrays the Department as the “agro-food pole of the ‘Deep South’” with three major divisions: the west (ham curing, bread industry and manufacturing of convenience foods), the centre (cow’s milk and cheese industry, meat

---

33 - Farm Manager’s Certificate.

Map 2 - Ewe's milk producers in Roquefort, 2004



processing, seeds) and the south (ewe's milk and cheese industry). The assets highlighted are the dynamic environment (training, R&D) and the quality dimension (through the official quality marks).<sup>34</sup>

### Decisive technical advancement

The specific nature of the Roquefort region is related not only to its production density but also and in particular to its technical extension services and its unquestionable edge in this field compared to the other sheep-farming regions in France or elsewhere in Europe. This edge is to be attributed first and foremost to the fact that from the 1960s onwards a development model was established which was based on several general principles (mechanisation of milking, rationalisation of feed, genetic selection) and was designed to supply the Roquefort industries, which were facing milk shortages at the time. As an illustration of this, milk testing and performance records concerned almost

<sup>34</sup> - Brochure published by the Committee on the Economic Expansion of Aveyron: "Aveyron, the Agro-Food Pole of the 'Deep South'".



80% of the farms in the RDO area (i.e. 95% of livestock) in 2001, whereas the figures for the Basque Country and Corsica were only 25% and 15% respectively.<sup>35</sup> The actors in the industry are often very proud of this feature: “*We’re in the forefront here; it’s an area where there is maximum follow-up. If the industry decides to do something, it’s carried out immediately. That’s how the limitation of production was brought about. This lead is perhaps what saves us.*”<sup>36</sup> The main actors in this “silent Roquefort revolution” are the Roquefort Confederation on the one hand and the industrial firms on the other, the leader being Société des Caves. Within the Confederation the creation and development of the two main services – quality and breeding – have been part of this technical development strategy. The Confederation has been collaborating with the National Institute of Agronomic Research since the 1960s with a view to researching milk testing and performance recording methods first of all and then genetic approaches to improving livestock. This mobilisation of all of the actors in the industry was necessary due to the relative isolation in which the Roquefort system was developing. Since ewe’s milk had been somewhat neglected by the regional and national authorities, the profession was obliged to look after its own development.

When it comes to building resources, this technical edge of the Roquefort area is fundamental, since it makes the industry an international reference in the ewe-breeding field. This position is reflected in a strategy where skills are transferred to other sheep-farming regions. Officials are in fact regularly called upon by both professionals and training centres to resolve technical problems or to provide support. The Roquefort Area Resource Centre, which is dedicated primarily to sheep farming, was set up in 1998 to meet these requests. The Centre was launched by professionals in the industry and has the special feature of federating a large range of actors involved both in the production field (chambers of agriculture, National Committee on Milk Ewes) and in more extensive regional fields (Saint-Affrique Agricultural College, regional authorities, Grands Causses Regional Nature Reserve). The Resource Centre was initially intended as a documentation centre dedicated to professionals and teachers in the agricultural field and focusing on concrete field data on ewes (feeding, health procedures, farm buildings, accounting, law, tax laws, and so on) and milk production (milking, selection, reproduction, cheese processing, etc.). Its second focus is the organisation of technical visits for students from colleges throughout Europe. The Centre’s ultimate objective is to be seen both by both local actors and outsiders as the tool for the technical development of the industry.

### *A demographic context that generates “production solidarity”*

In this very special production environment the unfavourable demographic dynamics that have already been mentioned (low population density, ageing) prompt actors to make maximum use of local resources. Whereas the main theme of the events in Larzac<sup>37</sup> was

35 - Source: National Committee on Milk Ewes.

36 - A manager in the farming department of the Roquefort Confederation.

37 - In the 1970s, the plan to extend the Larzac military camp elicited strong reaction locally and was finally scrapped in 1981.



the slogan “living and working in one’s local area”, the professionals in the industry seem to stress the need to “bring work to the local area”. MPs in the department of Aveyron have thus been endeavouring for several years to define a policy based on the appeal of the region to attract new firms. They have not only been considering tax concessions or access facilities but have also been devoting thought to the quality of the environment and the availability of services. These issues also concern the agricultural and agro-food sectors, where there are major recruitment problems.

This rather special context thus prompts professionals in the Roquefort industry to entertain special relations with their economic partners, as is shown by these various comments by producers and processors:

- *As far as feed is concerned, we try to buy what is available locally, but it’s also a question of relations. We all try to bring business to as many people as possible. It’s really important to make sure that everyone gets a bit of business.*<sup>38</sup>
- *As far as milk transport by local firms is concerned, these are practices that are continuing, but to my mind they aren’t really profitable. The fact is, I think it would be frowned upon to stop working with those people.*<sup>39</sup>
- *“I prefer to employ people from the region, from the local area, who know agricultural circles. They are jobs where one wants to cultivate loyalty. These aren’t commercial occupations where things move fast and there are constant major changes. On the contrary, I need stability so that producers know and recognise the people they are dealing with. And anyway it wouldn’t be logical to go looking for people elsewhere – it would be frowned upon.”*<sup>40</sup>

### *The RDO in the Roquefort system – a strengthening role*

The course of development followed by the Roquefort region makes the RDO an example in terms of organisation and commercial success. However, although the industry is certainly a success, the evaluation of the role played by the origin-labelled product must be qualified: it plays a crucial role, yes, but it is not all-powerful. For the major role of the Roquefort Confederation, before being a designation syndicate, is that of an inter-trade organisation responsible for managing the production of ewe’s milk, only half of which is marketed as the RDO product. The negotiations between milk producers and processors concern both adding value to the milk in Roquefort and other forms of manufacturing. Similarly, the technical edge of the Roquefort region is clearly to be attributed as much to the extremely specific nature of ewe’s milk production compared to that of cow’s milk as to the remunerative nature of Roquefort cheese. Thus, although its role must not be played down, the skills acquired by the actors involved are the result of a long accumulation process in which the origin-labelled product has been the focal point. However, its influence has undoubtedly been limited due to the fact that until recently there have been no constraints in the specifications relating to milk production.

38 - A milk producer from the Roquefort Area.

39 - An industrialist from the Roquefort industry.

40 - An industrialist from the Roquefort industry.

Signs of specification that are to be attributed directly to the RDO have nevertheless been observed in the last few years. The revision of the production constraints now promotes efforts to seek autonomy in fodder production, since three-quarters of the staple diet has to come from the farm and purchases of concentrates must not exceed 200 kg of goods per animal per year. These measures are intended to prevent excesses in the form of off-land farming and are liable to lead to reorientation of the production area and thus of its needs in terms of equipment and skills. Some feed manufacturers consequently offer a variety of products and have developed special feedingstuffs in order to comply with the new specifications. As regards training, the managers of La Cazotte Agricultural College have been devoting thought for several years to creating a trade diploma focusing on ewe's milk production, through which the skills acquired by students could be further specified. More time and attention would thus be devoted to the RDO and to the broader issue of quality in the courses taught.

Thus, ever since the industry emerged as an institution in the 1920s it has helped to shape a system dedicated primarily to the production of ewe's milk and cheese processing. This particular course of development has contributed to the "specialisation" of this region, in which there are relatively few alternative activities. The resources thus generated (skills, know-how in the sheep-farming, milk production and processing fields) contribute to regional differentiation which is potentially conducive to development. Furthermore, the fact that milk producers have reappropriated the RDO tends to further strengthen the specificity of the Roquefort system and thus enhance its sustainability. This approach geared to production is an important aspect of regional development in that it extends analysis to other types of actors. It cannot cover all dimensions of the process, however. By devoting attention to the links between professionals in the industries, local councillors and tourism actors we shall now further underline the multisectoral aspect of regional development.

## **Synergies between agriculture and tourism – building the region and interlinking resources**

When one observes the synergies between activities in the Roquefort region one remarks that it is a territory with blurred contours and little significance for tourists and consumers, a region where actors try to rely on the world notoriety of the origin-labelled cheese in order to highlight the other tourist amenities. As links between tourism actors and actors in the industry have progressively strengthened over the past few years, the various amenities the region has to offer have been gradually dovetailing.

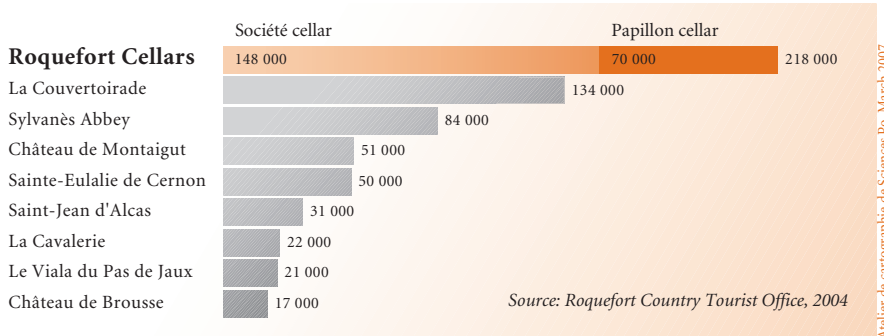
### *A world-famous cheese in an indeterminable region*

Although Roquefort's notoriety is indeed international, few people can actually locate the village on a map. Very few people actually know that Roquefort is also the name of a village under which there are caves where the cheese is ripened. What is more, the designation area seems to be totally disconnected from the existing administrative

network. Ewe's milk is produced primarily in the Midi-Pyrénées Region (Aveyron and Tarn), but there is also some production in Languedoc-Roussillon (mainly in Lozère). This vagueness of location is accentuated by the absence of any demarcated region which could serve as a basis for communication. Neither of the administrative networks (Aveyron, Midi-Pyrénées) nor the natural entities (Grands Causses, Larzac), nor the old provinces (Rouergue) are well enough known to serve as a medium for promoting the cheese as do other regions (Normandy, Savoy and Upper Savoy). The actors do not seem to regard the situation as a handicap, as the following marketing manager explains: *“We are fortunate in that Roquefort is so well known that one doesn't need to explain where it is. Roquefort isn't worried about communicating its whereabouts, because the product has a good image, and explaining exactly where it comes from isn't going to make any difference. The Roquefort Country is special; the natural landscape is preserved and there are wide open spaces. It's a far cry from genetically modified maize; its stony terrain, a region where life is harsh and nothing is taken for granted. That is an excellent image.”*

So, compared to regions such as Normandy or the two Savoys, the situation is reversed here: It is not the professionals in the industry who are relying on a region as a medium for their own communication, but the other actors who try to use the Roquefort image to promote their region, particularly in relations with tourists. This situation is accentuated by the fact that with over 200,000 visitors each year the Roquefort Cellars are undoubtedly the main tourist attraction in South Aveyron (see Chart 1).

**Chart 1** - Number of tourists visiting the Roquefort Country, 2004



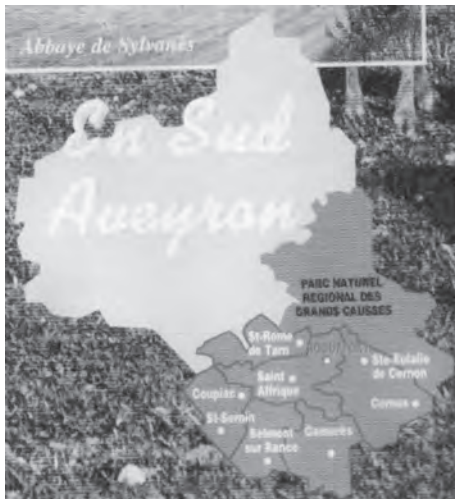
The lack of economic alternative to milk production mentioned above is also confirmed with regard to tourist amenities. Roquefort is clearly the only sufficiently relevant vector for communicating the image of the region. Indeed tourism professionals would like the Roquefort industry to place greater emphasis on the (Aveyron) origin of the product in its publicity, particularly in the TV spots produced by the Confederation. They consider that Comté cheese, which is advertised as a product of the Jura Mountains, and Ossau-Iraty cheese, which clearly claims Basque identity, should be taken as models.

### *Towards the emergence of the tourist region based on the Roquefort image*

Historically, due to the scale and success of the Roquefort production system the area did not open up to tourism except for the visits to the cheese cellars that were organised over 40 years ago by Société des Caves and Papillon. There was thus no permanent accommodation structure for visitors in the vicinity of Roquefort until the mid 1990s, when the Roquefort Tourist Office decided to create premises near the cellars where tourists could be provided with information and, in particular, where they could be directed to other interesting sites in the surrounding area (see Chart 1 above). A network gradually emerged which was structured around the Roquefort Tourist Office and its branches in the neighbouring municipalities, the aim being to spread the tourist manna, which was concentrated in one place, to best advantage.

After operating informally for several years, the “Roquefort Country” officially came into being in 2003 as a new tourist region, despite the reluctance of several industrialists, who still distrust tourism, and of the local councils in the other municipalities, which were anxious not to “disappear” for the sole benefit of the Roquefort Tourist Office. The very denomination of the structure was the subject of animated debate. Reference to Roquefort seemed inevitable, but the version “Roquefort Country” was finally preferred to “Roquefort Cheese Country”, which would have implied that the region had “nothing to offer” apart from the cheese cellars. Thus, although the cheese is the main communication theme, in “the Roquefort Country” it cannot be omnipresent (Figure 1 below).

**Figure 1** - The “Roquefort Country” zones and logo



Source: Roquefort Country Office, 2004.

This original approach thus creates a new territorial entity, which has the special feature of transcending the existing administrative divisions – a fact which causes some conflicts with local councillors. For the policies behind this zoning are not political but are geared directly to tourist demand. It is to be observed, however, that the dynamics remain limited exclusively to the department of Aveyron. The neighbouring departments actually seem reluctant to use the image of the product in their communications, since they consider that Roquefort is primarily part of a broader Aveyron issue. The structuring of the Roquefort Country thus refers to an effort to seek legitimacy in the regional appropriation of the product.

Moreover, the specific features which create the identity of this region reflect the production solidarity observed in the previous section. Tourism is conceived here as a development tool in its own right, as is illustrated by the following comments:

- *“The Tourist Office and its local branches must become tourism enterprises. Let’s stop talking about voluntary work and lack of professionalism. There have to be underlying economic interests at stake in order to maintain a whole region. That’s what generating economic activities in a region is about.”*<sup>41</sup>
- *“My duty is first and foremost to bring economic life to my area. There’s not much use in my selling Maroilles cheese in Saint-Affrique – I don’t see what the point would be. What I try to do is to use my profession to highlight what will bring economic life to my area – that’s my philosophy.”*<sup>42</sup>

It is only in the last ten years that the actors in the region have been using Roquefort’s notoriety. A further striking development is the attitude of the RDO professionals to these moves. Initially unaware of the advantages that opening up to tourism can bring, they are now beginning to realise the potential benefits. Their links with the other actors have become stronger, even if they are sporadic and concern as yet only a minority.

### *Synergies between actors and the construction of coherent tourist amenities*

The course of development with few tourism openings which characterised the industry until recently now seems to be changing to include new focuses of interest. Most industrialists are now taking more interest in tourist clientele, and small-scale manufacturers in particular are offering products for sale on site. Similarly, the field of operation of the Roquefort Area Resource Centre, which was initially purely technical, has now been extended to include the tourist dimension, the aim being to complement the tour of the cellars with an exhibition on sheep farming. This “Pastoralia” exhibition, which was opened in 2001, is an interactive presentation of the various dimensions of sheep farming (milking, feeding, animal care, etc.). It is now visited by almost 10,000 people. The Resource Centre has also undertaken to organise a major event in the south of Aveyron in the form of the Lacaune Sheep Festival. This 3-day event is entirely

<sup>41</sup> - An officer from the Roquefort Tourist Office.

<sup>42</sup> - A tourism professional in South Aveyron.

dedicated to sheep farming and is an opportunity for the professionals in the industry to meet and exchange notes on practices and techniques. An open day for the general public was included in the last festival programme for the first time and was attended by almost 12,000 visitors. Some milk producers also take part in regional measures, although this involvement is marginal. In the early 1990s sheep farmers' wives were keen to open their farms to tourists, a move which also met a specific demand: tourists were keen to see ewes in their daily environment, an experience which the cheese cellars could not provide. It was not until 2003 that the farms involved obtained sufficient support to give their activity new scope. The Grands Causses Regional Nature Reserve, which was created in the south of the Department of Aveyron in 1995, decided to grant funds for setting up reception rooms and planting trees and hedges around farms. And some industrialists decided to finance several promotion operations (production of leaflets). The "Roquefort Country Farm Visit Network" officially came into being in 2003; in addition to the farm visits the network also proposed tasting sessions to promote local products (Roquefort cheese, Côtes de Millau wine, ewe's milk desserts), and some 5,000 visitors took advantage of the offer the same year. In addition to the extra income generated by these activities, the network also provides an opportunity for sheep farmers' wives to socialise (since they live in relative isolation).

Another ad hoc action is that some local restaurant owners with upmarket establishments in the vicinity of the municipality of Roquefort-sur-Soulzon propose a special offer: menus composed exclusively of dishes made with Roquefort cheese.

The various products and services mentioned above (cellar tours, Pastoralia, farm visit network, restaurants) constitute the beginnings of a tourist system dedicated to Roquefort cheese. Relatively close links have gradually formed, particularly in the form of the exchange of leaflets and reductions on admission fees (Pastoralis/cellar tour). Société des Caves has gone even further: it has been proposing the "Epicurean trip" for several years now, an all-inclusive package comprising the tour of the cellars, "Pastoralia", a visit to a farm in the network and a meal at one of the restaurants. This package, which was created in collaboration with the Roquefort Tourist Office, actually comes close to the idea of a regionalised basket of goods and services developed by A. Mollard and B. Pecqueur (see first section above). Despite the role played by the Tourist Office, this move to interlink the various components of the basket seems to be primarily part of a private communication strategy. The local councillors are not involved to any great extent in these measures, which are carried out mainly by the businesses concerned. Although it is difficult to evaluate the success of this type of development, the visitor numbers provided by the Roquefort Tourist Office show an increase from 61,000 to 72,000 people in the period from 1998 to 2003. This increase has been benefiting the tourist offices in the vicinity of Roquefort in particular, which proves that the efforts to spread the tourist trade seemed to be bearing fruit. Furthermore, the south of Aveyron seems to have made up its shortage of accommodation to some extent (self-catering accommodation, B&Bs, etc.).

The Roquefort industry, whose strategy has been geared mainly to production, thus now seems to have been moving towards new regional focuses of interest for several years. These measures, which are launched mainly by private actors, are contributing to the emergence of tourist amenities organised in a wide radius around Roquefort cheese. Since the regional authorities are not involved, these are ad hoc, and sometimes even marginal, initiatives for the time being – a factor which is an obstacle to development.

## **Strengths and weaknesses of a course of development**

Due to its many different dimensions, the Roquefort registered denomination of origin is a particularly interesting subject of research, which raises questions in all of the social sciences. The international challenges facing RDOs today justify including the subject in the regional development field. Efforts to highlight the various contributions made by designations of origin to the dynamics of a region are a legitimisation tool in trade negotiations within the WTO. Constructing tools with which that contribution can be evaluated would therefore seem to be a *sine qua non* for the sustainability of the industries involved.

This is the approach we have adopted in our research, through which we have proposed several analysis grids illustrating the various facets of the regional development process. The Roquefort RDO industry provided a concrete example, with which tangible results could be presented demonstrating the potentially beneficial role to be played by RDOs in their specific regions.

The first part of the analysis consisted in assessing the economic significance of the industry and highlighted one of the specific features of the Roquefort RDO compared to other designations: its decisive importance for the future of a region where no other activity of scale is really emerging. It was essential, however, to enhance these statistical data with a historical analysis presenting the ins and outs of the legal protection of the product. It was shown in that context that the Roquefort RDO provides “full protection” and that the special way in which it operates (collection area and ripening area) has helped to keep a large number of jobs in the region.

Another way to broach the problem was to analyse the dynamics operating in production areas, devoting particular attention to the potential benefits of RDOs. Examination of the methods used to fix milk prices and of the mobility and practices of the actors involved thus demonstrated the role that a designation can play in terms of ensuring income, maintaining production and boosting the image of the profession, and as a marketing argument.

From a more qualitative point of view, the analysis of the course of development of the Roquefort production system revealed the capacity of an RDO – in a broader context of milk production – to generate specific resources potentially conducive to regional



differentiation (training, research & development) and thus to development. When the analysis was extended to all of the actors in the region, and in particular to tourism professionals, this revealed that a new region distinct from the designation area is emerging, which is based on the synergies between activities aiming to coordinate measures that were originally taken independently. Here the RDO demonstrates its capacity to make the regional amenities unique.

The various insights into the process also helped to confirm the idea that there is no ideal development itinerary. The Roquefort example shows that although a regional itinerary has a number of assets it also has weaknesses, which it is essential to identify in the context of implementation research. These weaknesses concern both the production dimension and the synergies between activities and they merit further comment.

Whereas the demographic context makes Roquefort milk production a fragile activity, production is drifting at the same time from the east to the west of the region, i.e. from pastoral areas (Les Causses, Rougiers) to regions with more grazing land (Ségala, Lézou – see Map 2). This trend, which started some twenty years ago, is to be explained by the intensification of activities in these areas towards the end of the 1980s (development of silage-making) with a view to compensating for land structures that were too small. A large share of milk production is now concentrated in Ségala and Lézou, since farming conditions on the limestone plateaus are more difficult (frequent droughts, poorer grass quality). The limitation of feed purchases from external areas that has been introduced in the new specifications could further accentuate this trend, and this would be a handicap for the most disadvantaged areas. Apart from the problems relating to land use, the progressive discrepancy between production realities and the images associated with the product (limestone landscapes) could eventually prove awkward for communication strategies based on traditional pastoral practices.

Furthermore, although the very high degree of specialisation of the production area is undoubtedly an asset, this type of development entails considerable risks in the event of a major crisis, whether in the health or commercial field. The income foregone as the result of the establishment of a Feta PDO is a reminder of this reality. From this point of view, the leeway of RDO professionals as actors in development would seem to be more limited.

The efforts to redeploy production resources towards tourism are part of this alternative approach, although they are still tentative and out of proportion with the scale of the activity. The danger inherent in these strategies undoubtedly lies in the largely monothematic nature of tourist amenities. There is no guarantee that in the years and decades that lie ahead “gastronomic” tourism and quality products will rank as high in tourist and consumer demand as they do at the present time.

One also wonders whether the restructuring of tourism actors around the Roquefort Country is geographically relevant and in keeping with the realities of the history of



the cheese. For the range of action of the structure “turns its back” on Larzac, where the cheese actually originated. Although special signboards for the benefit of both tourists and local residents have been erected in order to affirm the legitimacy of this region, this measure contradicts the action of the Midi-Pyrénées Regional Council, which erected signboards along the main thoroughfares several years ago with a view to highlighting the region’s quality products. These signboards pose a problem when it comes to Roquefort cheese in that a board on National Highway RN88 in the Department of Tarn announces that one is now entering the “Roquefort cheese region” approximately where the designation area begins. Without any real coherence with the action of the Tourist Office, this initiative can amount to a certain “watering down” of the cheese’s image in a region that is liable to be too extensive and difficult to identify.

In the final analysis, over and above development indicators the research results emphasise the need for a spatial approach to the processes involved. When devoting thought to the sustainability of their industries actors must constantly consider the relevant scales on which action should be carried out. Given the factors presented in this conclusion, that reflection is a cornerstone of measures to defend this gastronomic heritage and with it an important part of our identity.



# SPANISH PDO CHEESES

a still atomised market

*Mercedes Sanchez*

## Growth trends in Spanish cheese production and consumption

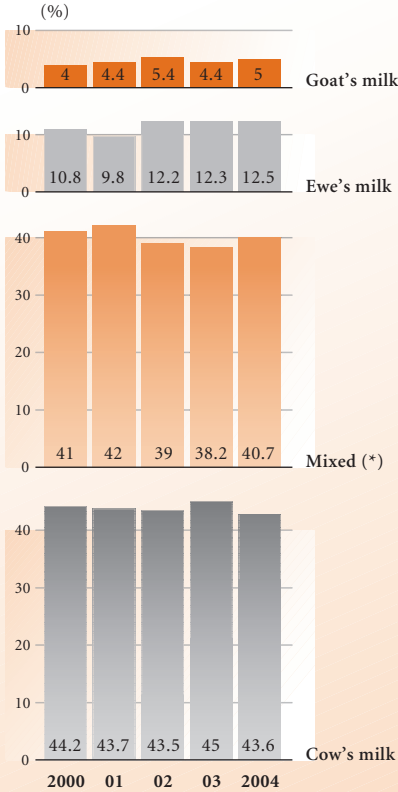
Recent economic and social developments have led to both increased opportunities and growing threats for the entire agro-food sector, not least the dairy section. In Spain, dairy produce accounts for a share of over 10% of net sales for the whole of the national agro-food industry, with annual sales totalling over 7.5 million euros. With 1,700 businesses and 27,000 workers (FENIL, 2006), this is the second largest branch of the agro-food sector after the meat industry. The fact that only 1.26% of the firms within this sector employ more than 200 workers, about 15% employ between 10 and 200 and 34% employ no salaried workers makes it a dual structure sector. Cow's milk production, which accounts for around 89% of total output, has risen by close to 8% in the last few years. Ewe's and goat's milk, in almost equal measure, account for the remaining 5% of total production, the sheep stock having grown by 17% and the goat stock by 11%. Table 1 depicts dairy production trends in recent years by type of milk, together with the first overall indicators of Spanish cheese production.

**Table 1 - Milk and cheese production in Spain (in tonnes) 2000-2004**

Product	2000	2001	2002	2003	2004	% Variance 2000-2004
<b>Milk output</b>	<b>6,100,800</b>	<b>6,444,700</b>	<b>6,691,500</b>	<b>6,634,300</b>	<b>6,656,900</b>	<b>+9.12</b>
Cow	5,453,900	5,801,600	5,967,000	5,914,000	5,921,500	+8.57
Ewe	304,800	310,000	348,600	351,300	357,300	+17.22
Goat	342,100	333,100	375,900	369,000	378,100	+10.52
<b>Cheese</b>	<b>255,000*</b>	<b>265,200</b>	<b>289,000</b>	<b>298,400</b>	<b>298,400</b>	<b>+17.01</b>
Cow's milk	112,700	116,000	125,600	134,400	130,000	+15.35
Ewe's milk	27,600	25,900	35,400	36,800	37,300	+35.14
Goat's milk	10,200	11,800	15,500	13,100	14,900	+46.07
Mixed	104,500	111,500	112,500	114,100	121,500	+16.26

Source: Ministerio de Agricultura, Pesca y Alimentación (MAPA) (Spanish Ministry of Agriculture, Fisheries and Food), and the Economic Development Institute of the Principality of Asturias. – \* Excluding cheese spread

**Chart 1 - Spanish cheese production, 2000-2004**



(\*) Any cheese processed from two or more types of milk is defined as mixed-milk cheese.

Source: Spanish Ministry of Agriculture, Fisheries and Food (MAPA) and Principality of Asturias Institute for Economic Development

Atelier de cartographie de Sciences Po, March 2007

Spain uses less than 5% of its raw milk output to produce cheese. This is well below the overall average for Europe, where, according to Langreo (2006) and López Tapia (2006) 32% of the total raw milk output is processed to make cheese. However, recent figures reveal a 17% increase in the volume of milk processed to produce cheese. Since this is higher than the increase in liquid milk output for the same period, it indicates an increase in the proportion of raw milk output used to create added value through processing to make cheese. Although there has been a higher increase in goat's and ewe's milk output in relative terms, these varieties account for approximately 5% and 13% of net supply (Table 1). These figures must be viewed with caution, however, since mixed-milk cheese accounts for close to 41% of Spain's total cheese output, any cheese processed from two or more types of milk being defined as mixed-milk cheese. Chart 1 summarises output trends for the different varieties of Spanish cheese, where the production of ewe's and goat's milk cheeses, despite being quantitatively less important, can be seen to be on the increase.

Cheese consumption in Spain has stabilised in recent years to around 7 kilos per person per year, i.e. 4.4 kilos more than in

the 1980s. While this is still well below the European average of 17 kilos per person per year, it is predicted to increase to 10.2 kilos according to the National Dairy Industry Federation (López Tapia, 2006). Table 2 gives the preference structure for cheese consumers in Spain, where 36% of demand is for mature and semi-mature cheeses, 31% for fresh cheese and the remaining 33% for other types. Fresh cheese consumption has risen in recent years, accompanied by a slight decline in the consumption of mature varieties. 89% of Spanish cheese consumption is household consumption, the rest being consumed outside the home.

While revealing a growing trend in cheese consumption in Spain, Table 3 is presented in order to further highlight the stability of the domestic market in recent years, except for

**Table 2** - Consumption trends of different types of cheese in Spain (tonnes) broken down into household and non-household (Horeca)\*, 2000-2004

	2000	2001	2002	2003	2004	% Variance 2000-2004
<b>Total consumption</b>	<b>266,950</b>	<b>283,540</b>	<b>295,311</b>	<b>260,300</b>	<b>265,758</b>	<b>0</b>
Mature and semi-mature	38.2%	42.8%	40.6%	39.10%	35.63%	-2.57
Fresh	27.8%	25.9%	29.8%	30.0%	30.6%	+2.8
Others	34%	31.3%	29.6%	30.9%	33.77%	-0.23
Percentage household consumption	86.2%	88.47%	88.47%	n.d.**	n.d.	
Percentage non-household consumption	13.8%	11.53%	11.53%	n.d.	n.d.	

Source: Spanish Ministry of Agriculture, Fisheries and Food (MAPA) and Institute for Economic Development of the Principality of Asturias. – \* Horeca: Hotels, Restaurants and Catering – \*\* n.d.: Non-defined due to missing data.

**Table 3** - Spanish per capita consumption trends for different varieties of cheese (kg), 2004-2005

Produit	2004		2005		% Variance volume (04/05)	% Variance per capita (04/05)
	Volume (kg)	Per capita consumption	Volume (kg)	Per capita consumption		
<b>Total</b>	<b>265,757</b>	<b>6.33</b>	<b>272,139</b>	<b>6.33</b>	<b>+2.4</b>	<b>0</b>
Fresh cheese	81,451	1.93	84,684	1.96	+3.96	+1.56
Cheese spread	31,375	0.76	31,349	0.71	-0.01	-6.57
Semi-mature cheese	95,690	2.25	96,771	2.25	+1.12	0
“Red ball” cheese	8,709	0.23	8,710	0.2	0	0
Emmental & Gruyere	3,859	0.12	3,565	0.12	7.62	0
Blue cheeses	2,196	0.03	2,244	0.02	+2.18	+33
Others	43,391	1.03	44,814	1.03	+3.3	0

Source: National Dairy Federation of Spain ([www.fenil.org](http://www.fenil.org))

the above-mentioned increase in the consumption of fresh cheese, which accounts for 31% of domestic demand, and a somewhat lesser increase in blue cheese consumption.

Despite these figures, which reveal a steady increase in cheese production and stability in demand with growth prospects, the cheese trade balance still shows a clear deficit. Charts 4 and 5 in the Appendix, which show Spanish cheese import and export trends

for the last few years, reveal that both imports and exports have increased by around 51% over the last five years, despite different starting points (182,000 tonnes of imports and 52,000 tonnes of exports). Fresh cheese has shown the highest growth among imported cheeses, followed by cream cheese, while “others”, along with fresh cheese, have led on the export side.

## Social and economic importance of Spanish PDO cheeses

Growth in Spanish cheeses bearing the EU-approved Protected Designation of Origin (PDO) is on a par with general cheese production. Thus, in Table 4, we can see an increase in the number of protected varieties, which has risen from 16 in the year 2000 to the current 23. This, however, amounts to a more or less stable share in relation to the total number of PDO food products in Spain, thus indicating an overall increase in Spanish PDO and Protected Geographical Indication (PGI) products. Cheeses account for 20% of these high-quality brands in Spain. The fact that the cheese sector is second in importance only to the wine sector gives some idea of the importance of this kind of productive activity for certain local economies.

Meanwhile, sales volume has increased by 27% over the last five years, taking it close to the 17,000 tonne mark, which is almost 6% of the country's total cheese output. Table 4 also gives some idea of the average volume of these higher quality brands, with output now averaging just over 700 tonnes, having dropped somewhat since 2000, a sign that the most recently created PDOs are smaller in size than those established in previous years. These mean figures are given here simply in order to provide some prior indication of the average size of production unit in the sector in preparation for the analysis of production structures that will be undertaken further on in the paper.

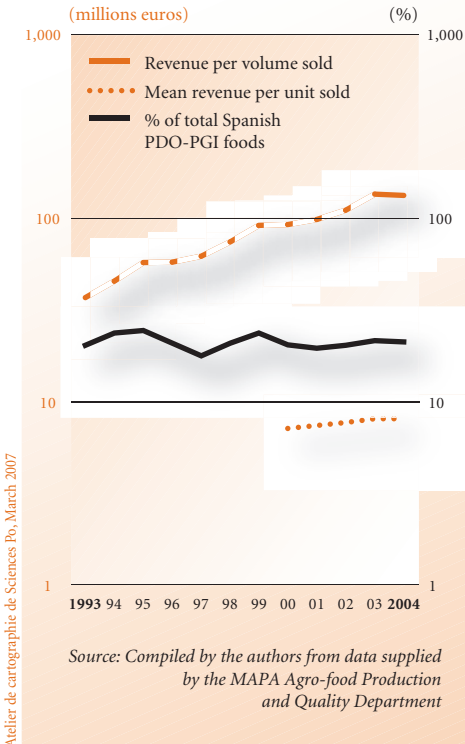
**Table 4 - Number of Spanish PDO cheeses plus sales volume in tonnes, 2000-2004**

Years	Number of PDO s *	% of total Spanish PDO food *	Sales volume (tonnes)	Mean sales volume per PDO (tonnes)	% PGI-PDO cheese in total cheese output
2000	16	20.25	12,910	807	5.06
2001	17	19.31	13,233	778	4.99
2002	19	18.18	14,365	756	4.97
2003	21	17.40	16,719	796	5.60
2004	23	18.25	16,454	720	5.51

Source: Compiled by the authors from data supplied by the MAPA Agro-food Production and Quality Department

\* Not including wines

**Chart 2 - Revenue from Spanish PDO cheeses, 1993-2004**



The analysis of the economic indicators for Spanish PDO cheeses shown in Chart 2 indicates that the sector is holding its own with a 21% share of the country's total high-quality food production and is calculated to be worth 131.92 million. It also shows that the sector registered an increase in revenue per unit sold, the figure having risen from 7.08 in 2000 to 8.02 in 2004, i.e. slightly more than the accumulated inflation for that period.

Continuing with further details of PDO cheeses, Table 5 gives a summary of the different designations of origin including the type of milk used, accredited livestock breeds, geographical area of production, and additional data relating to the year of establishment of the quality brand and an indication of average output per dairy and designation.

As regards the type of milk used to produce PDO cheeses in Spain, there is a predominance of cow's milk, which is used in the production of 10 different PDOs (Afuega'l Pitu, Arzúa-Ulloa, Cabrales, Cebreiro, Mahón-Menorca, Queso de Cantabria, Queso de L'Alt Urgell, Valdeón, Tetilla and San Simón da Costa), 6 use ewe's milk (Idiazábal, Queso de la Serena, Manchego, Zamorano, Roncal and Torta del Casar), and 4 use goat's milk (Murcia and Murcia al vino, Ibores, Majorero and Palmero). The rest are mixed-milk cheeses made from combinations of the three (Picón Bejes-Tresviso, Quesucos de Liébana, Cabrales<sup>1</sup> and Valdeón).

The main geographical areas of production are, in the north, the Cantabrian coast with four designations in Galicia and three in Asturias and Cantabria, while the Basque Country and Navarra share one high-quality brand and Navarra has another of its own. Turning to eastern Spain, Catalonia has one PDO cheese, while Castilla-León in the west has two designations in Zamora and León. Southern Spain is home to several different designations: three in Extremadura, two in Murcia and one in Castilla-La Mancha. Each of the Spanish archipelagos produces PDO cheeses; the Canaries have two and the Balearic Islands one.

<sup>1</sup> -Cabrales and Valdeón both have a cow's milk and a mixed cow/ewe/goat's milk variety.

Another point that should be mentioned is that all Spanish PDO cheese producers are committed to the exclusive use of milk from specific livestock breeds. One or more breeds native to the production area are used in each case, thus helping to forge the unique character of each variety.

In historical terms, some of these PDOs were established more than twenty years ago, while others are very recent, as shown in Table 5, which also includes as a final detail for analysis, the average size of Spanish PDO cheese production units. They can be described as small units on average, as befits the pursuit of rural development for which this food differentiation strategy was adopted. Thus, according to data presented by Galindo (2004), average output per cheese dairy is no more than fifty tonnes, with many

**Table 5** - Types, production areas, year of establishment and average output for Spanish PDO cheeses

PDO/PGI	Type and Area	Year in which PDO was established	Cheese dairies (2002)	Average output per dairy (t)
Afuega'l Pitu (PDO)	Full-fat cow's-milk cheese. Friesian and Asturias breeds. Asturias.	2000	n.d.	n.d.
Arzúa-Ulloa	Unpasteurised cow's milk cheese, made farmhouse-style and aged for at least six months. Rubia Gallega, Alpine Brown, Friesian and cross-breeds. Galicia.	2006	25*	0.09
Cabrales (PDO)	Semi-soft blue cheese, made from unpasteurised cow's milk or mixed cow, ewe and goat's milk, aged for 2-4 months. Asturias	1990	50	10.4
Cebrero (PDO)	Cow's milk cheese. Breeds: Rubia Gallega, Brown, Alpine, Friesian. Varieties ranking from soft to cured. Galicia.	2005	n.d.	n.d.
Gamedo (PDO)	Full-fat aged cheese, made from mixed cow, ewe and goat's milk and lightly smoked. Friesian, Asturian, and Brown cow breeds; Lacha, Carranzana, and Milschalfe sheep breeds; Alpine, Murcian, Picos de Europa and Saanen goat breeds. Asturias.	2006	n.d.	n.d.
Idiazábal (PDO)	Full-fat pressed cheese made from unpasteurised ewe's milk. Lacha and Carranzana sheep breeds. Aged for 3 months, smoked or un-smoked. Basque Country and Navarra.	1993	35	34.94
Mahón-Menorca (PDO)	Pressed cheese made from cow's milk. Frisian, Mahonesa/Menorquina and Alpine Brown. Two varieties: Traditionally crafted and industrially produced in Mahón. Menorca (Balearic Islands).	1985	44	49.95



Table 5 - (contd.)

Picón Bejes-Tresviso (PDO)	Made from mixed cow, ewe and goat's milk. Tudanca, Alpine Brown and Friesian cow breeds, Lacha sheep and Pyrenean or Picos de Europa goats. Cantabria.	1994	11	2.27
Queso de Cantabria (PDO)	High-fat pressed cheese made from whole clean cow's milk. Friesian cows. Cantabria.	1985	4	68.75
Queso de L'Alt Urgell y de la Cerdanya (PDO)	Cheese made from whole pasteurised cow's milk. Friesian, short-ripened. Lérida and Gerona (Catalonia).	2002	1	170
Queso de la Serna (AOP)	Full-fat or high-fat cheese made from ewe's milk matured for at least 20 days. Merino breed. Badajoz (Extremadura).	1993	14	13.28
Queso de Murcia (PDO)	Goat's milk cheese, fresh or matured for 60 days. Local Murcian goat breed. Murcia.	2001	n.d.	n.d.
Queso de Murcia al Vino (PDO)	High-fat pressed cheese made from goat's milk. Local Murcian goat breed, steeped in red wine for 45 days. Murcia.	2001	7	37.28
Queso de Valdeón (PDO)	Semi-soft rich creamy blue cheese, made from cow's milk or mixed cow, ewe and goat's milk, whole or buttermilk. Alpine Brown cows, Churra and Castella sheep and crosses thereof, and Alpine, or Local Leon goats. León.	2006	n.d.	n.d.
Queso Ibores (PDO)	Full-fat cheese made from raw unpasteurised goat's milk from Serrana, Verata, Retinta goats and crosses thereof. Needs at least 60 days to mature. Cheese made from milk from producers' own herds and matured for 100 days provides the handcrafted variety. Cáceres (Extremadura).	2006	6	16.16
Queso Majorero (PDO)	Pressed full-fat goat's milk cheese, matured from 8 to 60 days. Mild, semi-mature and mature varieties from Majorera goat's milk, soft variety from 15% Canary ewe's milk. Fuerteventura (Canaries).	1996	21	16.28
Queso Manchego (PDO)	Full-fat ewe's milk cheese. Manchega sheep. Hand-crafted and industrial production, mature and semi-mature varieties, matured for at least 60 days. La Mancha (Castilla-La Mancha).	1995	82	98.71
Queso Palmero (PDO)	Goat's milk cheese, small dairies, unpasteurised milk. Fresh, soft, semi-mature and mature. Usually smoked. La Palma (Canaries).	2001	6	2.5
Queso Tetilla (PDO)	Cow's milk cheese, soft to semi-mature (7 days). Friesian, Alpine brown, Rubia Gallega. Galicia.	1993	28	75.35
Queso Zamorano (PDO)	Ewe's milk cheese, pressed, 1kg to 4 kg. Churra and Castellana sheep. Matured for 100 to 365 days. Zamora.	1993	10	28.1

**Table 5 - (contd.)**

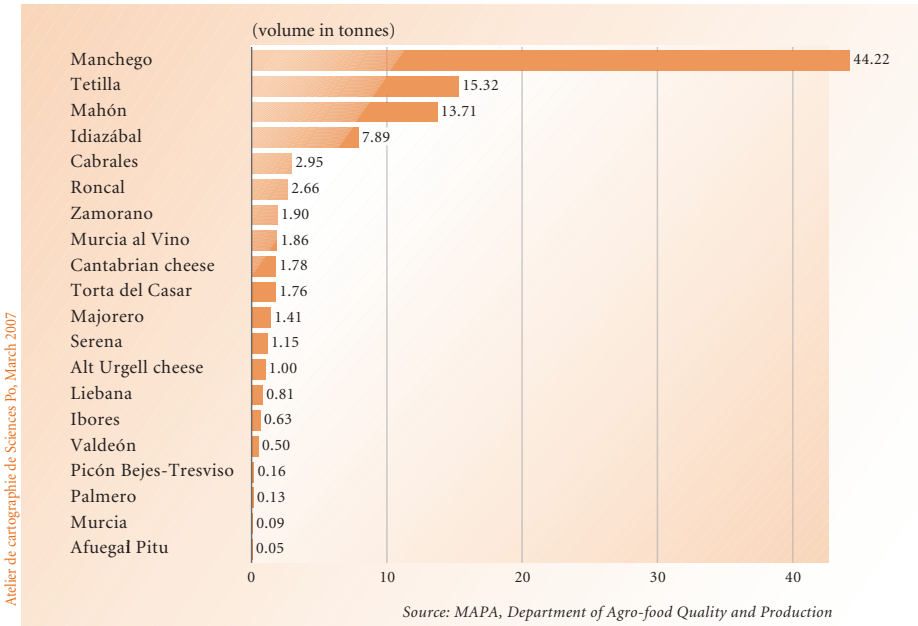
Quesucos de Liebana (PDO)	Mixed cow, ewe and goat's milk cheese. Tudanca, Alpine Brown and Friesian cows, Lacha sheep and Pyrenees and Picos de Europa goats. Smoked and unsmoked varieties. Cantabria.	1994	8	11.75
Roncal (PDO)	Ewe's milk cheese, handcrafted. Matured for 4 months. Rasa and Lacha breeds from Navarra. Roncal (Navarra).	1991	5	91.8
San Simón da Costa (PDO)	Cow's milk cheese. Rubia Gallega, Alpine Brown, Friesian or crosses thereof. Lugo (Galicia).	2005	n.d.	n.d.
Torta del Casar (PDO)	Cheese made from raw ewe's milk, matured for 60 days. Production becoming less seasonal. Cáceres (Extremadura).	2002	8	29.5
<b>Total</b>			<b>340</b>	<b>49.17</b>

Source: Compiled by the authors from data supplied by the Spanish Ministry of Agriculture, Fisheries and Food (MAPA), Galindo (2004) and [www.agroalimentacion.coop](http://www.agroalimentacion.coop) – \* 2006 data.

designations producing much smaller volumes per dairy. The largest in volume are the Manchego, Roncal and Idiazábal ewe's milk cheeses and the Queso Tetilla, Cantabria and Mahón-Menorca varieties, which are made from cow's milk. That is to say, under each of these designations there is at least one cheese dairy with a higher volume than average for the sector.

Economic data are summarised in Chart 3, which shows where the various Spanish PDO cheeses are sold and indicates their market share by value. Before going into a more detailed analysis of these data, we present Chart 3 which indicates the share of some brands in the Spanish quality cheese market. This shows that Manchego ewe's milk cheese is the leader in output volume, contributing 44% of the total supply, followed at some distance by two cow's milk varieties, Tetilla (15%) and Mahón-Menorca (14%). Standing out among the lesser productions we find two ewe's milk cheeses, Idiazábal (8%) and Roncal (3%), plus the Cabrales cow's milk variety (3%) and a 2% share made up by Zamorano, Majorero, Cantabria, Murcia al vino and Torta del Casar. All remaining brands have smaller shares in the market.

Approximately 80% of output is sold on the domestic market, with a very large proportion never leaving the region where it is produced (Table 6). Of the remainder, half goes to the EU and half to other countries. The market for the various Protected Designations of Origin has achieved an average year-on-year growth of +1.6%, surpassed, among the designations with the largest market shares, by Queso de Tetilla (+19%), Cantabria (+6.5%) and Idiazábal (+6%). The remaining growing market shares belong to designations that started off with much lower output levels. The main ones on the negative side, i.e. with declining output levels, are Manchego (-10%) and Roncal (-4.7%). These variations may be due, at least in some cases, to

**Chart 3** - Share of Spanish PDO cheese market, 2004

Atelier de cartographie de Sciences Po, March 2007

dependence on raw material, together with the degree of integration along the distribution chain, or to a decline in output by some of the main dairies. They should be viewed with caution, however, since the observations are based on output data for two specific years. On the whole, output tends to be fairly stable.

In economic terms, the market dropped slightly in average value (-1.5%) over the 2-year sample period, suggesting that at least some designations may be making less profit. Among the market leaders, Manchego cheese is the only one which suffered a loss of market position during the period considered, but it has recently appeared to be showing recovery. Some of the high-output PDOs – Cabrales (+3.5%), Idiazábal (+8.5%), and Queso de Tetilla (+19%) – were more successful in marketing their output.

One last point worth mentioning with respect to the economic outlook for PDOs is the profit differentials across the different brands. The average price for cow's milk cheeses with certificate of origin is 6.2 euros/kg, a figure exceeded by Afuegal Pitu (8.75) and Cabrales (7.98). Ewe's milk cheese, meanwhile, commands an average of 11.33 euros/kg, a price topped only by Torta del Casar (15.9). Goat's milk PDO cheeses command an average of 7.56 euros/kg, the highest profits in this segment being taken by Murcia cheese (9.29).

**Table 6** - Share of Spanish PDO/PGI cheese market by volume and value, 2003-2004

Designation	Market share by volume 2004 (tonnes)				
	Market				
	Domestic	UE	Other countries	Total	% Variation on 2003
Afuera'l Pitu (G)	8	0	0	8	*
Arzúa-Ulloa (G)	n.d.	n.d.	n.d.	n.d.	n.d.
Cabrales (C-M)	437	24	24	486	-6%
Cebrero (G)	*	*	*	*	*
Gamonedo (M)	*	*	*	*	*
Idiazábal (E)	1,209	62	28	1,298	+6%
Mahón-Menorca (G)	2,129	36	92	2,256	+2.6%
Picón Bejes-Tresviso (M)	27	0	0	27	+8%
Queso de Cantabria (G)	293	0	0	293	+6.5%
Queso de L'Alt Urgell y de la Cerdanya (G)	23	131	12	165	-3%
Queso de la Serena (E)	190	0	0	190	+2.1%
Queso de Murcia (G)	11	1	3	14	-12%
Queso de Murcia al Vino (G)	118	38	150	306	+17%
Queso de Baldeón (C-M)	25	22	35	83	-28%
Queso Ibores (G)	88	8	7	103	+6.2%
Queso Majorero (Ch)	232	0	0	232	-32%
Queso Manchego (E)	4,582	1,351	1.43	7,276	-10%
Queso Palmero (G)	22	0	0	22	+47%
Queso Tetilla (G)	2,490	16	14	2,520	+19.4%
Queso Zamorano (E)	284	14	15	313	+11.4%
Quesucos de Liébana (M)	134	0	0	134	+42.5%
Roncal (E)	372	52	13	437	-4.7%
San Simón da Costa (G)	*	*	*	*	*
Torta del Casar (E)	264	22	4	290	+23%
<b>Total</b>	<b>12,936</b>	<b>1,777</b>	<b>1,741</b>	<b>16,454</b>	<b>+1.6%</b>

Tableau 6 - (contd.)

Designation	Market share by value 2004 (million euros)					Av. price (kg) euros 2004
	Domestic	UE	Other countries	Total	% Variation on 2003	
Afuera'l Pitu (G)	0.07	0	0	0.07	*	8.75
Arzúa-Ulloa (G)	n.d.	n.d.	1	1	1	1
Cabrales (C-M)	3.5	0.19	0.19	3.88	+3.5%	7.98
Cebrero (G)	*	*	*	*	*	*
Gamonedo (M)	*	*	*	*	*	*
Idiazábal (E)	13.90	0.71	0.32	14.93	+8.5%	11.50
Mahón-Menorca (G)	12.64	0.21	0.54	13.40	+6.3%	5.94
Picón Bejes-Tresviso (M)	0.22	0	0	0.22	+10%	8.15
Queso de Cantabria (G)	1.31	0	0	1.31	+9%	4.47
Queso de L'Alt Urgell y de la Cerdanya (G)	0.13	0.75	0.07	0.95	-2%	5.76
Queso de la Serena (E)	2.09	0	0	2.09	+7%	11.00
Queso de Murcia (G)	0.09	0.01	0.03	0.13	-7%	9.29
Queso de Murcia al Vino (G)	0.94	0.31	1.20	2.45	+20%	8.01
Queso de Baldeón (C-M)	0.16	0.14	0.22	0.51	+4.1%	6.14
Queso Ibores (G)	0.70	0.06	0.06	0.81	-4.7%	7.86
Queso Majorero (G)	1.25	0	0	1.25	-32%	5.39
Queso Manchego (E)	41.23	12.16	12.09	65.48	-10%	9.00
Queso Palmero (G)	0.16	0	0	0.16	+45%	7.27
Queso Tetilla (G)	10.91	0.07	0.06	11.04	+19%	4.38
Queso Zamorano (E)	2.95	0.15	0.16	3.25	+13.6%	10.38
Quesucos de Liébana (M)	0.91	0	0	0.91	+46.7%	6.79
Roncal (E)	3.79	0.54	0.13	4.46	-4.7%	10.21
San Simón da Costa (G)	*	*	*	*	*	*
Torta del Casar (E)	4.20	0.35	0.07	4.61	-1.5%	15.90
<b>Total</b>	<b>101.5</b>	<b>15.64</b>	<b>15.13</b>	<b>131.92</b>	<b>-1.4%</b>	

Source: Compiled by the authors from data supplied by MAPA, Department of Agro-food Quality and Production.

\* First year in operation, no PDO at time of survey.

C: Cow, E.: Ewe, G: Goat, M: Mixed.

## Consumer-perceived food quality: the challenges ahead for Spanish PDO cheeses

In an increasingly saturated market, with ever keener competition, the importance of quality strategies as a factor of market success for certain products is beyond discussion. The supply side may not take the same view of quality as the demand side, however. The above data provide ample evidence of the significance of Spain's quality cheese production. The main differentiating attributes have to do with production methods, the use of unique livestock breeds and geographical origin, and commitment to rural and local development. These values are gaining in relative importance, at least for some consumer segments, and the main challenges facing these products thus relate to such issues such as how to attract more consumers to these groups who are interested in origin-based quality-differentiated foods, and how best to adjust marketing strategies and production structures to meet current and potential demand, bearing in mind that this adjustment must be made without detriment to the characteristics that differentiate the products.

One possible plan of action in Spain might be to improve the available information by sending out a message designed to enhance the public's appreciation and knowledge of cheese. Despite the large number of varieties (over one hundred at the last count, Espejo, 2001) and a cheese-making history dating back to ancient times, an interesting qualitative survey conducted in Spain by Ikerfel (2002) at the request of the Ministry of Agriculture, Fishing and Food, reveals that the Spanish public relates cheeses to different types of consumption occasions and predicts that each one will have its own growth potential. However, the Spanish public was found to have only limited knowledge of the various PDO brands, the average consumer being able to name no more than three spontaneously. Consumers mention tradition, i.e. the human factor, as the main characteristic of these cheeses.

As on other markets, and as suggested by Thakor & Lavack (2003), consumers associate PDOs with symbolic, functional and situational attributes. This should not be overlooked when it comes to designing marketing strategies, since some authors hold that symbolic values are more important to consumers than real values (Bonetti, 2004; Di Monaco *et al.*, 2005; Pratesi, 2002). These factors may be of a tangible or intangible nature, or, to put it in information theory terms, they may be pre-purchase search attributes, time-of-purchase experiential attributes, or credence attributes, which cannot be checked either before or after purchase. Nowadays, in the case of high-quality products such as PDOs, credence attributes (tradition, hand-crafted, natural, origin) may be reaching a degree of relative importance high enough to place them on a par with experiential attributes (flavour, aroma) or search attributes, in particular brand or price. In other words, consumers have been shown to be more loyal to foods where choice is based on search or credence attributes rather than experience attributes (Jiang, 2004). In the same vein, Kupiec & Revell (2001) found that the sensitivity of demand

responded less to price changes and more to flavour, appearance or use, in the specialty food market, which includes the hand-crafted and unique PDO varieties on which this study focuses.

Thus, the traditional and authentic aspect of this type of regional food product is what is highlighted in the marketing strategy, owing to the growing appreciation of these values by consumers (Kuznesof *et al.*, 1997). This comes in addition to the discovery that PDO cheeses are consumed predominantly in urban Spain (Tendero & Bernabéu, 2005), where emotional or symbolic elements linked to tradition and culture are increasingly appreciated. This does not mean that the functional attributes of cheese should be ignored, however.

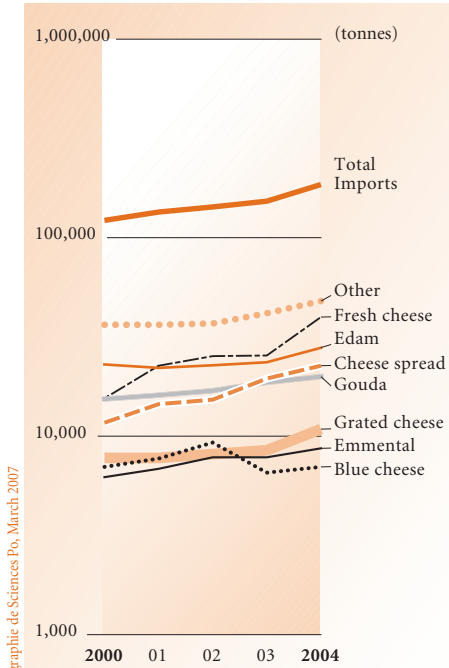
Thus, in light of the intrinsic uniqueness of Spanish PDO cheeses, which enables them to attain good market positions, producers need to show enough skill to create and transmit a strong brand image, as noted by Christy & Norris (1999). This is perhaps where some shadow may emerge, making it more difficult to assess the growth potential of these products, since in the majority, as shown, supply is highly atomised. This will be of little help when it comes to creating appropriate marketing structures and it will also immediately reduce the possible marketing channels, resulting in a dependence on specialised distribution (Langreo, 2006).

There is a third differentiating factor of this type of product that is subject to debate, which is to what extent they can be used to improve rural sustainability and development. Support for the capacity of these products to achieve this purpose in Spain can be found in Navarro *et al.* (2006), a study of the Queso de la Serena variety. Taking a broader perspective, however, Callois (2006) applies a regional economic model, which leads the author to take a cautious view of the degree of rural development for the local population achieved by this means and to suggest that industrial development is preferable to development of the services sector, which may have less impact in the area of origin.

To sum up, no report on behaviour trends among food consumers fails to highlight their taste for change (Instituto Nacional del Consumo, Spain, 2000). The Spanish PDO cheese-producing sector is not immune to these changes, and will therefore need to adapt to the market in terms of the format, presentation and even composition of cheeses if the certification boards deem it necessary in order to meet potential market demands. It is no less true, however, that special skills will be needed on the supply side in order to strike a balance between tradition and new trends.

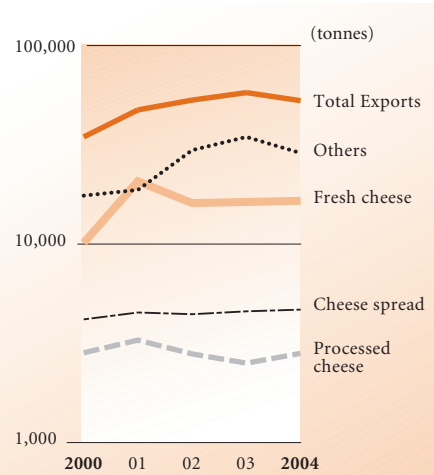
## Appendix

**Chart 4 - Cheese import trends for Spain, 2000-2004**



Source: Compiled by the Principality of Asturias Development Board (2006) from data supplied by Alimarket and ICEX.

**Chart 5 - Cheese export trends for Spain, 2000-2004**



Source: Compiled by the Principality of Asturias Development Board (2006) from data supplied by ICEX.



# THE QUALITY OF AGRO-FOOD PRODUCTS IN TUNISIA

developing a strategy

*Lokman Zaibet*

## Major changes

Current trends show significant changes on agrifoodstuff markets and the establishment of quality standards in order to comply with national and international regulations and to satisfy the growing consumer demand for quality products. The majority of Tunisian exports go to European markets, which have become demanding in terms of quality, hygiene, origin, environment and animal welfare (Andersen *et al.*, 2004).

The partnership agreement signed between Tunisia and the EU facilitates trade between the two partners but requires Tunisia to comply with EU directives with regard to quality standards. Laudable efforts have been made to upgrade the agro-food sector and to extend the adoption of international standards. The demand for quality products also constitutes a requirement for the local market.

In this chapter we shall present the determinants of agro-food product quality and the efforts made by the various operators to improve that quality, particularly in the field of legislation and the adoption of quality standards and trade names. We shall also look at the role played by groupings (collective action) in the development of organic agricultural products and products with designation of origin, quality rules on the local market, and, finally, consumer attitudes and perceptions.

## National policy and the legislation in force

The concern for food safety<sup>1</sup> and quality in Tunisia is well rooted both in legislation and in traditions and practices. Current legislation is based on regulations such as the decree of 10 October 1919 on fraud control, the organisation of trade and the control of imported agricultural commodities and foodstuffs. The present legislative framework is composed of a series of laws on:

- standardisation and product quality (1982),
- consumer protection (1992),

---

<sup>1</sup> - Safety is defined as opposed to health risks; quality is defined by reference to properties which consumers seek.

- trading in agricultural commodities (1999), and
- animal husbandry conditions and the quality of animal products (2005).

## Standardisation and quality

Act no. 82-66 of 6 August 1982 on standardisation and quality established the bases for the quality of all products and services. The National Institute for Standardisation and Industrial Property (INORPI) was created under the authority of the Ministry of Economic Affairs. Its role is to take all action concerning standardisation, the quality of products and services, metrology and the protection of industrial property. The INORPI represents Tunisia in international bodies in the standardisation field, and this has enabled Tunisian standards to be aligned with international (ISO) standards. The institution is furthermore responsible for promoting quality and the creation of national brands in accordance with those standards, delivering quality certificates and authorising the use of these brands and certificates. The INORPI is responsible for certifying inventions, registering trademarks and brand names, and applying the provisions on industrial property, on the protection of that property, on designations of origin and on indications of source.<sup>2</sup> In the case of Tunisian standards the National Standards Commission, also known as the *Codex alimentarius* Commission, refers to the international standards of the *Codex alimentarius*. This commission, which was set up in November 2000, is aiming to establish a system for providing information on the *Codex* in order to propagate these international standards. Furthermore, in response to the European decision (Directive 93/43/EEC of 14 June 1993) to apply principles of control according to the HACCP system, Tunisia has been taking a series of measures since 1999 to adopt those principles. In addition, the INORPI set up a department in 1997 for certifying quality systems according to ISO 9000 standards; this department has been invested with the means and skilled staff necessary for running that certification system.<sup>3</sup>

## Consumer protection

Act no. 92-117 of 7 December 1992 is the principal reference for the agro-food product controls carried out by the departments of the Ministry of Trade and Ministry of Public Health. It comprises the following main sections defining rules on:

- product safety (including agro-food products),
- fair trading,
- consumer protection (consumer information and product assurance) as well as offences and the relevant penalties.

2 - The 1999 law on designations of origin does not refer to the INORPI (see *infra*).

3 - Although as the result of the efforts made in the past two decades the Tunisian provisions governing agricultural commodities and foodstuffs are in conformity with European and international standards, there is still a significant gap between what has been achieved and ambitions in the certification and quality field (see section on the adoption of quality standards).

The originality of this law lies in the reference to compliance with the statutory specifications (reference standards or technical specifications) and civil liability: the first individual or business to place a product on the market is responsible for the quality of that product.<sup>4</sup> A guarantee is also required concerning the nature, type, essential qualities, composition and active principles of products.<sup>5</sup> And finally, the final supplier of a product is also liable for product safety and his liability “cannot be excluded or limited by virtue of a contractual clause”. With regard to consumer protection, a “National Council for Consumer Protection” has been set up, whose main responsibility is to issue opinions and present proposals with a view to ensuring product safety, ensuring that consumers are informed and guided, improving product quality and all aspects conducive to ensuring consumer protection, and consolidating the role played by consumers in the economy (JORT, 1992). The following ministerial departments are authorised to carry out health inspections: Hygiene Department (Ministry of Health), Veterinary Department (Ministry of Agriculture), Hygiene Department (Ministry of the Interior/municipalities), and Product Quality Department (Ministry of Trade).

## The quality of agricultural commodities

A ministerial decree makes compliance with the existing quality standards compulsory for the control of the quality of agricultural commodities. The decree of the Ministry of Trade of 10 June 1999 lays down rules for that purpose concerning the packaging, standardisation and presentation of agricultural commodities and fisheries products as well as the conditions to be met with regard to quality, grade and variety (JORT, 1999). Where quality standards exist, products must comply with those standards, except in the case of products displayed on local producer markets. These regulations also lay down the conditions for anti-parasitic treatments, chemical treatments, artificial colouring, and wastewater irrigation. In the case of animal products, an act of parliament (October 2005) completes the array of regulations on the quality of agricultural commodities. This is Act no. 95/2005 of 18 October 2005 on animal husbandry in general and the quality and safety of animal products (slaughtering, milk). It lays down rules on animal products, the improvement of genetic resources, the organisation of pastureland, food product quality, animal health and livestock products. The section on animals and livestock products (Part 5 of that Act) refers to the conditions for transporting animals, abattoirs,<sup>6</sup> meat transport and the collection and quality of milk. These laws are not yet adequately implemented due to the difficulties encountered by the various actors involved; this is illustrated by the application of quality standards in the milk sector. Milk collection centres and industrialists have concluded agreements for that purpose and standard contracts have been presented to the collection centres for use in agreements concluded with milk producers. These contracts aim essentially to apply the Tunisian NT14-141 quality standards, which

---

4 - The law does not specify verification or conformity assessment procedures geared to suppliers, however.

5 - This law does not explicitly specify a guarantee for agro-food products.

6 - It must be noted that an Abattoir Master Plan is currently being implemented which will stipulate hygiene conditions in abattoirs. A list of approved abattoirs has been drawn up for that purpose. Of the 225 abattoirs operating in Tunisia 57 have been approved (DG Animal Health).

specify colour, taste, density, and acidity, as well as the alcohol, phloroglucinol and reductase tests. The collection centres undertake to carry out all of the analyses on receiving the milk and to inform the farmer of the results of these analyses in the event that milk is refused. They also undertake to pay a bonus calculated according to the physical-chemical and bacteriological quality of the milk. That quality is defined by the analyses carried out by the centres when they receive the milk, and this is often a source of litigation between the contracting parties due to the lack of transparency of that operation. The farmers for their part undertake to comply with the hygiene rules which are often dictated by the veterinary surgeons of the milk collection centres and which stipulate that the milk must not be watered down or mixed with the milk of cows that are sick, that it must be kept in hygienic conditions and that fat must neither be added nor removed. Due to the presence of intermediaries (private persons and service cooperatives) who collect the milk for the centres and to traceability difficulties in the event that the centres refuse milk, it is not at all easy for the collection centres to verify whether these requirements, which are annotated by the clauses of the contract, have been met (Zaibet *et al.* 2005).

## Quality promotion schemes

The legislative framework outlined above demonstrates the will to protect consumers against any risk caused by substandard food products. However, quality promotion still depends on the efforts made by private firms to satisfy consumer needs both on the local market and on export markets. To begin with, the government focused on assisting the private sector and targeted export sectors, which it considered to be the priority. A Programme for Upgrading the Industrial Sector was implemented in 1996 to that effect on the occasion of Tunisia's accession to the WTO and the partnership agreement with Europe, and a National Programme for Promoting Quality (PNQ) was launched in conjunction with that scheme. A fund for developing competitiveness (FODEC) was also set up in order to implement these programmes. And finally, the Priority Technological Investment Programme (ITP) was established to complete the system.

## The Upgrading Programme (PMN)

The aim of this programme, which was launched in March 1996, was to help businesses to prepare better for the opening of the Tunisian market with a view to the entering into effect of the partnership agreement with the European Union. The State has granted substantial financial aids through a "fund for developing industrial competitiveness", with which assessment studies are carried out and followed up with upgrading recommendations. These studies are conducted either by the Agro-Food Technical Centre (CTAA)<sup>7</sup> or by private consultancies. The upgrading process (and the aids granted in this context) basically comprises two components: (1) physical

---

7 - The CTAA was set up by a decree of the Ministry of Industry of 29 February 1996; its mission is to provide technical assistance for industries in the AFI sector. The main sources of funding are the FODEC and international cooperation.

investment (modernisation and laboratory equipment); (2) intangible investment (training of specialists and adoption of quality control and certification systems). The pre-assessment study is also carried out free of charge by the CTAA. A total of 3 470 businesses are now involved in the scheme, 214 of which operate in the services sector, and 1 705 of these businesses are also beneficiaries of the ITP scheme (priority technological investment programme). Table 1 presents the progress made in the processing of applications for ISO 9 000 and HACCP certification: before the PMN (upgrading) scheme was introduced there were no agro-food businesses with the HACCP system, but as the result of the scheme the number of certification applications has risen to over 85, i.e. 34% of all applications.

**Table 1** - Implementation of the PMN scheme from 1996 to 2006

System	Prior to PMN 1995	After PMN 1996-2006	
		%	Number
ISO 9000	6	31	545
HACCP (IAA)	none	34	85

Source: Upgrading Office, [www.pmn.nat.tn](http://www.pmn.nat.tn), 2006.

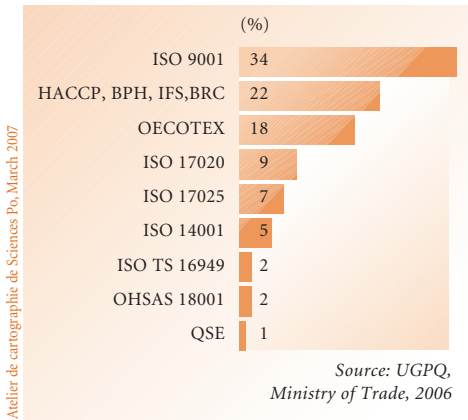
## National Programme for Promoting Quality (PNQ)

This programme focuses essentially on setting up the ISO 9 000 quality system; it is under the authority of the Ministry of Industry and Energy. The CTAA is in charge of monitoring the execution of the programmes for the agro-food sector. Since the scheme was launched in 1996 it has focused essentially on the ISO 9001 systems of reference (1994 and 2000 versions).<sup>8</sup> By the end of April 2001 it had resulted in the ISO 9000 certification of 270 businesses, 130 of which were involved in the programme, 4 recognised laboratories (TUNAC and COFRAC), 36 experts trained in quality audit techniques and 700 managers specialising in the quality field in general.

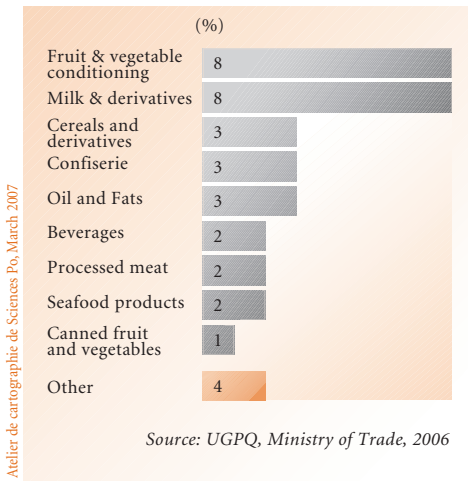
In response to the European directives on product traceability, a new programme was recently launched – in April 2005 – concerning other reference systems such as that used in the large-scale retail trade. This new programme has been followed by the creation of a Programme Management Unit (UGPQ); it will run for a period of 3 years (2005-2007), the objective being to promote international standards and reference systems concerning quality management, safety, hygiene, environment and sectoral management systems. The UGPQ is responsible for running this scheme and makes Tunisian and international experts available to the beneficiary firms on a basis of 20 to 60 man-days of expertise for each firm, depending on the type of project involved. The role of these experts is to provide technical assistance and guidance during the phase

<sup>8</sup> - 41 businesses had obtained certification according to these reference systems by the end of the second 3-year programme for promoting quality in 2001.

**Chart 1 - Distribution of businesses involved in the programme by reference system, by May 2006**



**Chart 2 - Distribution of agro-food businesses involved in the programme by subsector, by May 2006**



when the quality management system is being set up. The programme targets 600 businesses with a view to enabling them to obtain certification. By 24 May, 140 businesses had enrolled in the scheme; 26% of the participating firms are agro-food businesses and have opted for specific reference systems: HACCP, BPH, IFC, and BRC (Chart 1).

The programme is run in conjunction with the ITP programme and receives financial support from the state through the ITP-FODEC. It enjoys European Union support through the Industrial Modernisation Programme (IMP). The ITP programme comprises an intangible investment component (for amount < 70,000 DT) intended for the certification of quality systems and a physical investment component for equipping laboratories (with computers, etc.) for amounts up to 100,000 DT. Corporate participation in the scheme is governed by an agreement between the UGPQ, the CTAA and the business concerned on the basis of the system set out in Table 2 below, according to which a business which enrolls for certification (such as HACCP certification) costing 9,000 DT pays only 2,700 DT and the rest is covered by the ITP grant.

## HACCP<sup>9</sup> pilot programme (CTAA)

Following a cabinet decision, a pilot programme for setting up the HACCP procedure was launched in May 1999 to run in parallel with the schemes implemented in the PMN and PNQ context. This pilot scheme is run by the CTAA, the aim being to introduce the HACCP quality system in 100 businesses over a 5-year period. The objective is to develop hygiene infrastructures with a view to compliance with the directives of the European

9 - Other pilot schemes have been implemented in the PMN context: CTAA-ONUDI-Italy Cooperation: 10 firms; CTAA-ETE (Euro Tunisie Entreprise) Cooperation: 30 firms.

**Table 2 - Share of certification costs paid by businesses**

Reference system	Total lump sum (DT)	Share paid by the business	ITP grant
1 certification	9,000	2,700	6,300
1 integrated system (*)	15,000	4,500	10,500
BPH	7,000	2,100	4,900

Source: UGPQ, Ministry of Trade, 2006.

(\*) An integrated system comprises two or more reference systems (e.g. quality, safety and environment).

Union. More specifically, this will provide a means of improving and controlling safety, hygiene and environmental conditions in the agro-food industry, improving the competitiveness of agro-food businesses, and promoting the export of agro-food products. The measures that have been taken consist of: (1) action to raise awareness of the HACCP procedure and food security; (2) the creation of a national reference system and the compilation of a databank on food security; measures to train trainers/consultants in the field; (4) measures to train 300 HACCP officers in the 100 target businesses; (5) technical assistance to help the 100 businesses to set up an HACCP procedure; and finally, (6) action to train quality auditors for certification purposes.

## Certification and quality marks

The objective of the PMN and PNQ programmes is to promote the adoption of quality procedures and certification. The rules in force do not directly require certification of conformity with international standards. Decree 3158 of 17 December 2002 on public procurement stipulates that specifications must refer to Tunisian standards or, where no such standards exist, to international standards. Conformity with Tunisian standards (*normes tunisiennes* – NT) is certified by an NT certificate issued by the INORPI. NT standards are developed for virtually all agricultural commodities and food products, but only “approved” standards have to be applied. There are only two products at the present time – vinegar and mineral waters – for which standards have been approved by decree.<sup>10</sup> In the present chapter we present the certification efforts made by businesses as reflected by the number of certification systems.

## Certification bodies and quality reference systems in Tunisia

There are nine certification bodies in Tunisia, most of which are international (European) organisations with representations in the country. According to the information we obtained in discussions with managers and experts in the field, the three most represented recognised bodies are Tunicert, TÜV and the AFAQ. The others are in the process of becoming recognised or are at the project stage (ProCert, for example).

<sup>10</sup> - Although these standards have been approved, they have not come into force since the decree approving them was issued in 1990.

**Table 3** - Certification bodies in Tunisia

Body	Country
TuniCert/INORPI	Tunisia
TÜV	Germany
AFAQ	France
AIB-VINCOTTE	Belgium
SGS	Switzerland
BVQI	France
DNV	France
Certo	Tunisia
ProCert	Switzerland

Source: UGPQ, Ministry of Trade, 2006.

## Adoption of quality standards and certification

The results presented below were collected through direct contacts with the bodies most represented in Tunisia, consultation of web sites,<sup>11</sup> and lists collected by the UGPQ in the context of monitoring quality promotion schemes. The data collected show that the number of businesses certified as complying with the quality systems is still very low compared to the efforts mentioned above (Table 4). It must be noted that HACCP/ISO 22,000 certifications are specific to the agro-food sector, whereas ISO 9001 certifications may include agro-food firms. We therefore present a list of certified agro-food products in Table 5. The response from agro-food businesses is clearly still very limited compared to both the efforts made (to encourage firms and raise awareness) and what is happening in partner countries. In the date sector, for instance – one of the pillars of the agricultural economy in view of the role it plays in exports – there is not a single firm on the list of certified businesses. According to a recent study on date-exporting firms, only two firms were enrolled in the HACCP scheme in the context of the CTAA pilot programme (Laajimi *et al.*, 2004). The problems/constraints mentioned by these firms are connected with lack of information, lack of training, and lack of funds, particularly in the case of the smallest firms. There is a more important reason for this low level of participation, however: it is the fact that the application of these systems has been voluntary to date. In the case of fisheries products, for example, virtually all of the businesses exporting to European markets are exporting on the basis of consolidated lists that have been approved by the European Commission. These lists are determined through visits organised by the Commission. The Commission approved a list of 62 businesses in 1999, and by 2005 the number had risen to 93.

<sup>11</sup> - AFAQ ([www.afaq.org](http://www.afaq.org)), TUNICERT ([www.inorpi.ind.tn](http://www.inorpi.ind.tn)), TÜV ([www.tuvm.com.tn](http://www.tuvm.com.tn))



**Table 4 - Adoption of quality systems (all industries) according to certification bodies and reference systems**

	TÜV	TUNICERT	AFAQ*	PROCERT**
ISO 9001	125	19	1	0
ISO	6	2		0
22000/HACCP	9	0		0
ISO 14001	1	0		0
OHSAS	7	0		0
ISO TS 16949		135		
NT				
<b>Total</b>	<b>148</b>	<b>156</b>	<b>1</b>	<b>0</b>

Source: UGPQ and author, 2006.

\* Only agro-food firms – \*\* As of May, no Tunisian firm had yet been certified by ProCert.

**Table 5 - Certified agro-food products, 2006**

Business (*)	Sector of activity / certification area	Certifying body	Reference system
	Couscous	TÜV	ISO 9001, HACCP
	Concentrated tomatoes		ISO 9001, HACCP
	Flavouring agents		ISO 9001, HACCP
	Milk and milk derivatives		HACCP
	Margarine		ISO 9001, HACCP
	Milk		ISO 9001, HACCP
	Prepared meat products		HACCP
	Milk		HACCP
	Carbonated soft drinks		HACCP
	Hotel trade		ISO 22000/HACCP
	Prepared meat products, convenience foods	INORPI	NT-ISO 9001
	Margarine, fats		HACCP-NT
	Slaughtering, processing		HACCP-NT
	Carbonated drinks	AFAQ-Tunisia	ISO 9001

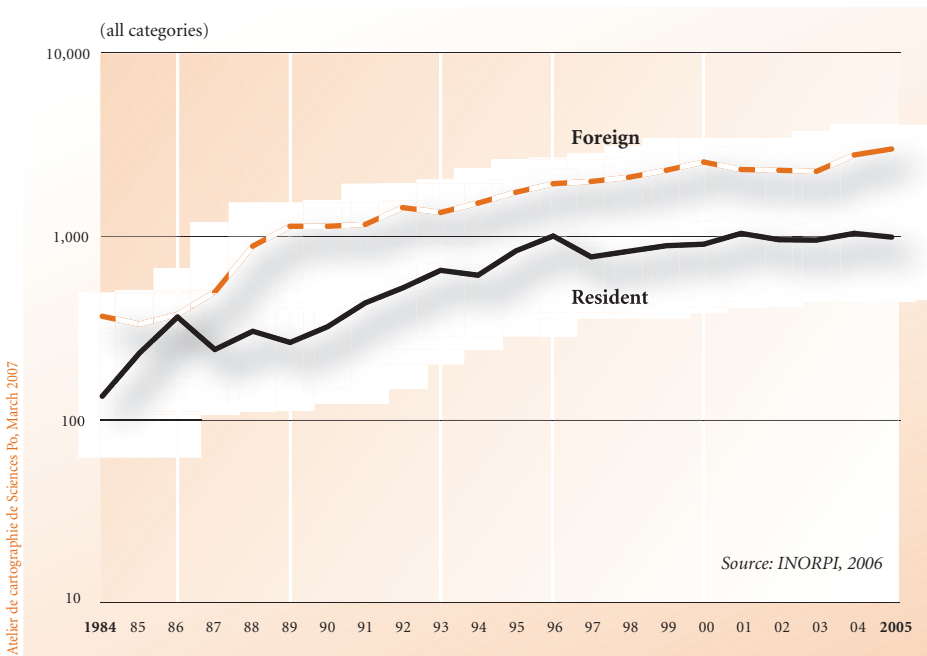
Source: TÜV, INORPI, AFAQ – \* The names of the firms have been deleted for reasons of discretion.

## Adoption of brand names

Trademarks and brand names are private quality identification marks. Their use dates back further than that of conformity certification. They are visible signs which enable consumers to distinguish between products offered for sale. They have to be registered

with the INORPI, and this gives them exclusive right of use and protects them against counterfeits. The development of a brand indicates an implicit commitment to quality, since the name carries the image of the firm. The evolution of registrations shows that international brands are the commonest (foreign) brands, national brands accounting for only 30% to 40%. Agro-food trade names account for around 50% and are created mainly in categories 29, 30, 31 and 32 (see annex for description). The number of registered national brands has more than doubled since 1990 (rising from 315 to 1,020 in 2004). Few brands are registered despite the incentives and facilities provided by the INORPI (in terms of procedure and protection costs) and the fact that the FODEC covers 70% of the costs incurred in the context of the ITP programme. Brand protection costs 271.60 DT whenever an application is filed, and renewal costs 389.60 DT. It should be pointed out that conflicts can arise in the case of unprotected brands or when brand names are used which sound similar (such as Dwaref and Defef for tuna fish).

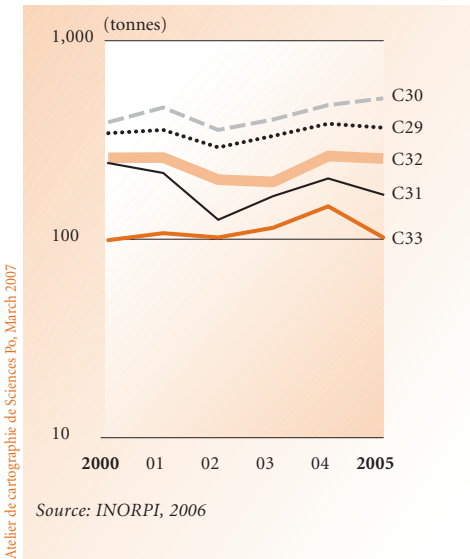
**Chart 3 - Evolution of the number of registered brands, 1984-2005**



## Organic agriculture and designation of origin/indication of source

Amongst the other official quality marks that are currently being developed we would mention the designations of origin (Registered Designation of Origin and Indication of Source) as well as the Organic Agriculture label.

**Chart 4 - Evolution of the number of brands in the agro-food sector by category, 2000-2005**



Atelier de cartographie de Sciences Po, March 2007

## Organic agriculture

Organic agriculture is a recent phenomenon in Tunisia. The National Commission on Organic Agriculture was established by a decree of 24 May 1999, and the law on organic agriculture was passed on 5 April the same year. The list of recognised controlling authorities and certification bodies was laid down by ministerial decree of 29 August 2003; it comprises three German bodies (ECOCERT, BCS and LACON) and one Italian organisation (IMC). These bodies are responsible for applying the specifications in the organic farming field. Although this is a recent practice it has already concerned almost all agricultural subsectors and all regions of the country. The governorates of Mahdia, Tozeur and Sfax are the most represented in terms of acreage (Map 1 and 2), olives

(54.16%), dates and almonds being the main crops grown (Chart 5). Exports consist mainly of olive oil and dates (Tables 6 and 7) and account for 1% to 2% of the total exports of these commodities.

**Table 6 - Organic output in Tunisia**

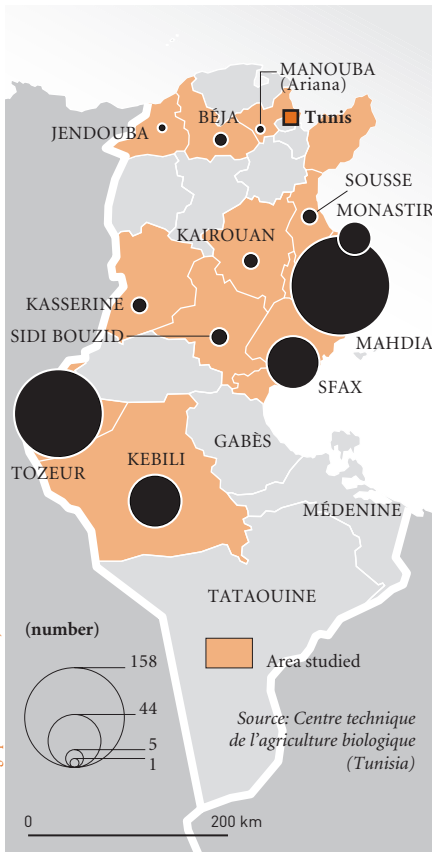
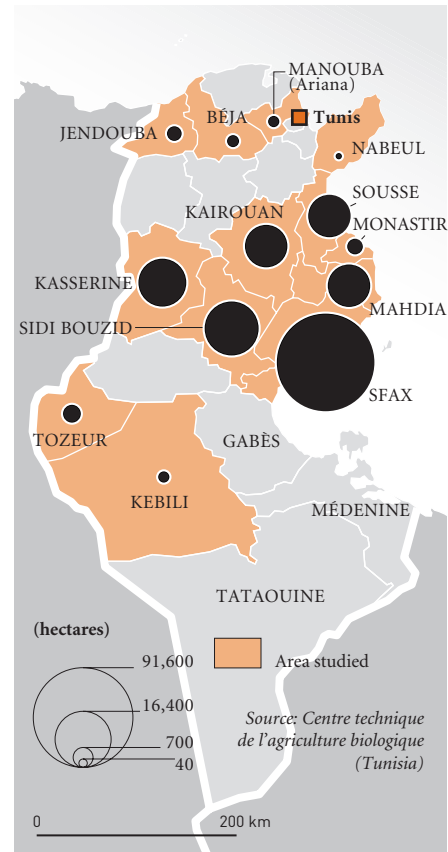
Commodities	Output (tonnes)				
	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Olive oil	3,000	1,000	338	400	6,721
Dates	400	2,500	1,732	2,900	3,500
Vegetables	200	400	340		
Almonds	20	25			
Aromatic crops + medicinal plants	20	30	85		
Jojoba	6.5	0	6		
Wine	400 HI	400 HI			
Table olives			58		

Source: Centre technique de l'agriculture biologique (Tunisia), 2006.

**Table 7** - Evolution of organic product exports in Tunisia

Commodities	Exports (tonnes)				
	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004
Olive oil	400	600	368	180	2,225
Dates	400	670	739	830	789
Vegetables	200				
Almonds	20				
Aromatic crops and medicinal plants	20				
Jobba	6.5				
Wine	400				
Table olives					

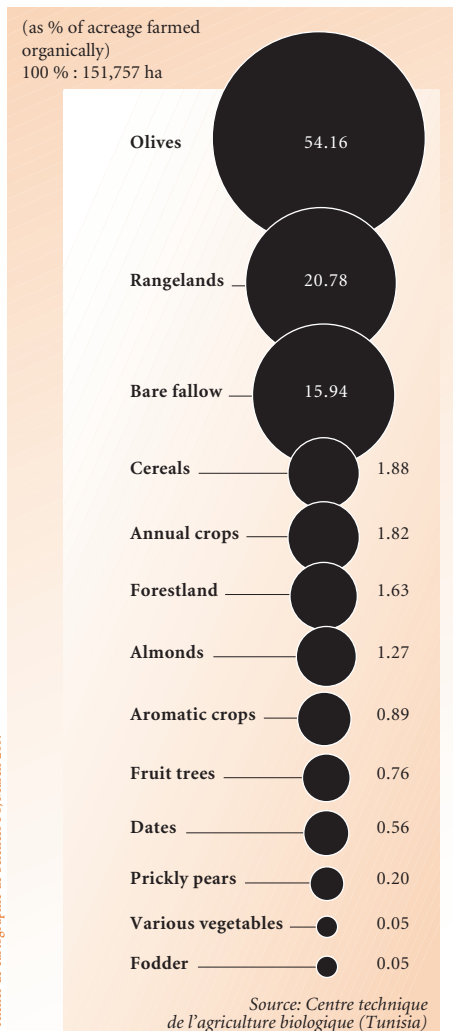
Source: Centre technique de l'agriculture biologique (Tunisia), 2006.

**Map 1** - Number of farmers in organic agriculture, 2006**Map 2** - Acreage farmed organically, 2006

## Products with Registered Designation of Origin (RDO) or Indication of Source (IS)

Promoting the quality of agricultural commodities by introducing quality marks such as registered designations of origin and indications of geographical origin has been a matter of concern for many years. The first efforts actually date from the 1950s (law of 1946) and resulted in several registered designations of origin in the winemaking field such as the Mornag, Kelibia and Sidi Salem RDOs (in Nabeul), the Grand Cru de Mornag RDO (in Ben Arous) and the Tibar RDO (in Béja). But no RDO has been registered in the other sectors since that time. A new law was passed in 1999 (Act n°. 57

**Chart 5 - Distribution of organic farming by crop, 2006**



Atelier de cartographie de Sciences Po, March 2007

of 28 June 1999) with a view to establishing a legislative framework for quality marks of this nature. More specifically, a Technical Advisory Committee (CTC) has been set up with a view to monitoring and applying the measures connected with this programme. A national programme for promoting the quality of agricultural commodities and the competitiveness of the sector has been implemented in collaboration with the World Bank to underpin this strategy; it ran from 2002 to 2006. The development of Indication of Source specifications has so far been registered for two products: *Grenades de Gabès* (pomegranates) and *Pommes de Sbiba* (apples); 15 pomegranate producers and 420 apple producers have joined this scheme.

## Quality and the local market

The main concern of most of the quality programmes presented above is to promote competitiveness and boost exports. The quality of agricultural commodities and agro-food products on the local market is administered by testing for product conformity with NT standards and through hygiene inspections of processing and distribution premises (decree of 18

September 1993, amended by a decree of 23 July 2003). In the case of fresh agricultural produce, controls concerned the following aspects: freshness, homogeneity, ripeness and stamping. Furthermore, the decree of the Ministry of Trade of 10 June 1999 lays down rules for the packaging, standardisation and presentation of agricultural produce and fisheries products. That decree stipulates the packaging conditions for agricultural and fisheries products as well as the conditions which must be met with regard to quality, grade and variety. Where quality standards exist, products must comply with those standards, except in the case of produce displayed on local producer markets. The Directorate for Quality and Consumer Protection of the Ministry of Trade is responsible for the above-mentioned controls and carries out the visits to processing premises (central directorate) and distribution premises (regional directorates). Processing plants are supposed to follow documented self-administered control procedures (project underway) and to carry out control procedures throughout the production chain. The inspections that are conducted concern the raw material, the finished products and the tests carried out. Samples are also taken for analysis on the basis of specific reference standards or tests.

The principle of self-administered controls requires internal procedures such as the HACCP procedure, but only very few plants are currently equipped to carry them out. Since controls in the agro-support industries were abolished in September 2005, the responsibility for self-administered controls must now be delegated to the businesses themselves. A survey<sup>12</sup> was conducted to that purpose in March 2006 on a sample of agro-food firms; according to the results, controls are not carried out systematically, nor have self-administered control procedures been introduced. Efforts are being concentrated for the time being on raising awareness of the obligation to carry out self-administered controls.

Other projects are also underway for approving processing units and agricultural commodity markets. The Abattoir Master Plan aims to establish hygiene conditions in abattoirs and lays down the list of abattoirs that have been approved according to pre-established conditions. Of the 225 existing abattoirs 57 have been approved. A further study has focused on the authorisation of livestock markets, and a list of 83 authorised markets has been drawn up out of a total of 148. The current situation pending implementation of the results of these studies does not do justice to the efforts made, particularly in the field of legislation.<sup>13</sup>

---

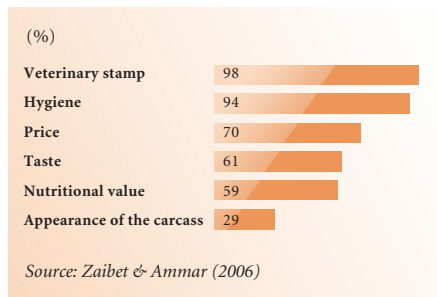
12 - Survey conducted by the Directorate for Quality and Consumer Protection (Ministry of Trade) in 90 businesses within the context of action to monitor the new provisions.

13 - Observation in the field has revealed several shortcomings concerning hygiene conditions in markets and abattoirs (research project conducted by the author in the El Fahs region).

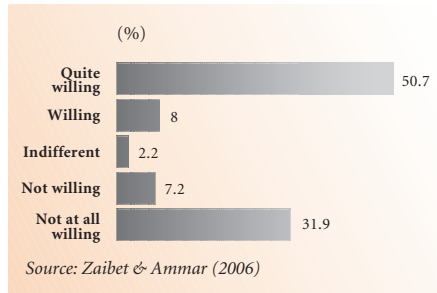
## Quality perception and behaviour of Tunisian consumers

Research on consumer behaviour in Tunisia has focused on the perception of product quality in general (Zaibet *et al.*, 2005) and in particular on the quality of red meat (Zaibet and Ammar, 2006). The objective of studying such behaviour is related to the role which consumers can play in the quality standard adoption process.

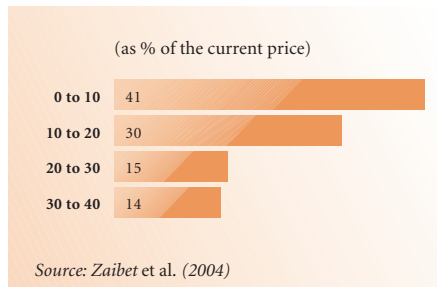
**Chart 6 - Perception of the quality of red meat, 2004**



**Chart 7 - Willingness to pay for the quality of red meat, 2004**



**Chart 8 - Willingness to pay for quality, 2004**



Consumers base their choice on their own perceptions, i.e. they want to buy a product because it seems to correspond with their preferences. It is their perception of products which influences their choice. This subjective perception means that they attribute products a number of qualitative features. They do not judge the intrinsic attributes of a product directly but choose an item which makes a good impression on the basis of a number of extrinsic indicators. In the case of red meat the intrinsic attributes include tenderness, flavour, freshness, nutritional value, guarantee as regards health, etc. The extrinsic attributes, on the other hand, are the price, origin, food safety mark (hygiene, veterinary stamp), etc. Our research has shown that Tunisian consumers devote more attention to health aspects (veterinary stamp), hygiene and, to a lesser extent, the price and nutritional value (Chart 6 and 7). On the other hand, only 50% of consumers are perfectly willing to pay more for better quality (this shows a preference for average quality). Table 8 shows that with regard to quality in general only 7% of interviewees stated that the presence of a quality mark was a main issue when choosing a food product, whereas 80% were prepared to pay more for better quality (in the case of a sample selected amongst customers of the CARREFOUR and PROMOGRO chains). The conclusions from these initial studies show that Tunisian consumers are mainly concerned about

**Table 8 - Perception of food product quality**

Attributes	Number of replies	Percentage
Ingredients	95	23
Production date	39	9
Expiry date	114	30
Quality mark	29	7
Price	97	24
Origin	32	7
<b>Total</b>	<b>406</b>	<b>100</b>

Source: Zaibet et al. (2004).

hygiene and that brand names are preferred to official quality marks. Some population segments seem to be informed and aware of the role played by quality marks, on the other hand, and are prepared to pay more for quality.

## Development prospects

According to this presentation, we have observed that the main concern underlying the quality programmes run at the national level to date is to improve the competitiveness of the agro-food sector and that the programmes are geared to export markets. Apart from the official upgrading or quality promotion programmes, fewer efforts are made at the level of private enterprise to improve quality on the basis of international standards – a fact which makes one wonder whether these plans are sustainable. The local market is less targeted by these schemes, with the result that local consumers are virtually absent or otherwise presumed to be indifferent to quality.

Furthermore, the demand for agricultural commodities and agrifoodstuffs depends essentially on the evaluation criteria used by consumers. Whereas certain characteristics – such as freshness, tenderness and flavour in the case of meat – are specific to a given product, others are more general and are perhaps factors which govern consumer behaviour as a whole. Studies on consumer market prospects (Trail, 1992) show that quality is the Number One concern for consumers. Several forms of quality guarantee are being developed such as the indication of geographical origin and registered designation of origin or other guarantees – such as processed meat that is guaranteed farm produce. Organically farmed products are also in great demand and have high income elasticity. These forms of quality are developing in Tunisia, but progress is very slow.

The new programme managed by the Programme Management Unit, which is running for the 2005-07 period, aims to promote international norms and reference systems in the fields of quality management, safety, hygiene, the environment and sectoral



management systems. It targets 600 businesses with a view to enabling them to obtain certification. This ambitious scheme will be able to contribute both to the certification and to the awareness of the businesses concerned. There is no historical study available at the present time on the evaluation of earlier (PMN-CTAA) programmes. A study of that nature could provide insight into what has been achieved but also regarding the constraints perceived or encountered by operators in the agro-food sector in their efforts to obtain certificates of conformity. Furthermore, the sustainability of the programmes that have been launched in terms of genuine participation of the private sector and willingness to continue outside the context of organised programmes must be evaluated if pertinent lessons are to be drawn.

## Appendix

**Table 9** - Specific quality reference systems in the national programme for promoting quality

Reference system	Designation
ISO 9001	Seeks to guarantee control of processes and to improve them continuously in addition to the classical requirements of quality guarantee.
ISO 14001	Defines the requirements for setting up an environment management system.
OHSAS 18001	Aims to guarantee compliance with health, hygiene and safety rules within the undertaking.
HACCP/ISO 22 000	Food safety management system specific to the AFI sector.
ISO TS 16949	Quality management system applied to the automobile industry.
EKO TEX	System for controlling undesirable substances in textile products.
BRC/IOP	Safety requirements for agro-food packaging materials (British Retail Consortium).
IFC	Safety requirements for agro-food packaging materials food security).
QSE	Quality, safety, environment This is a reference system comprising 3 reference systems together: ISO 9001, ISO 14001 and OHSAS 18001.

Source: UGPQ, 2006.

**Table 10** - International classification of (agro-food) products and services

Class	Designation
C 29	Meat, fish, poultry and game; meat extracts; preserved, dried and cooked fruits and vegetables; jellies, jams, stewed fruit; eggs, milk and milk products; edible oils and fats.
C 30	Coffee, tea, cocoa, sugar, rice, tapioca, sago, artificial coffee; flour and edible grain preparations, bread, pastry and confectionery, ice creams, honey, treacle, yeast, baking-powder, salt, mustard, vinegar, sauces (condiments); spices; ice.
C 31	Agricultural, horticultural and forestry products and grains not included in other classes; live animals; fresh fruits and vegetables; seeds, natural plants and flowers; animal feed, malt.
C 32	Beers; mineral and aerated waters and other non-alcoholic beverages; fruit drinks and fruit juices; syrups and other preparations for making beverages.
C 33	Alcoholic beverages (except beers).

Source: UGPQ, 2006.

**Table 11** - Numbering of NT standards in the agro-food sector

NT code numbering	Title
100	Water quality
3	General principles for elaborating food product sampling methods
230	Milk and milk products
46	Labelling, storage and transport of foodstuffs
27	Food microbiology
33	Edible nuts, pulses, dried fruit and vegetables
6	Hygiene
77	Cereals and cereal products
97	Canned and semi-preserved foods
31	Meat and meat products
21	Fish and fisheries products
59	Juices and beverages
28	Sugars and sugar derivatives
27	Tobacco, tobacco products and matches
36	Cocoa products and chocolate
22	Quick-frozen foods
100	Tea, coffee, spices and flavourings
35	Animal feed and animal husbandry
6	Poultry and egg products
44	Fresh fruit and vegetables
7	Foods for infants and children
10	Food additives, pesticide residues and product toxicity
120	Oils and fats
19	Foodstuffs

Source: INORPI, 2006.





**3** PART THREE

**QUALITY AND STRATEGY**

of the milk and milk  
product industries



# THE FRENCH MILK INDUSTRY

a major and mature market

*Jean-Louis Maubois*

## Position in Europe and the world

With a milk output of almost 24 million tonnes, France ranks second in Europe just behind Germany (27.7 million tonnes) but is well ahead of Italy and the Netherlands (11 million tonnes) (CNIEL, 2006). This collected output, 95% of which is processed, amounts to 1/4 of the output of the Indian subcontinent (100 million tonnes) or 1/3 of US output and was equalled by China in 2005. A workforce of 160,000 people is employed in milk production and processing.

The French milk processing industry is the leading agri-food industry with a turnover of almost 18 billion, almost 1/3 of which is exported. It ranks amongst the world leaders through the diversity, quality and innovative nature of its products.

## The structure of milk production in France

### Milk producers

The number of milk producers has been divided by four in the course of the past 13 years. There are currently around 105,000 such producers, but the number is continuing to decrease by 1.5% to 2% per year. The dairy stock has decreased by half over the same period. There are some 3,900,000 dairy cows in France with an average output of 6,070 L/lactation. Almost 50% of farms have an annual production quota ranging between 150,000 L and 400,000 L. In addition to this specialisation in dairy farming (the average quantity delivered per producer has increased by 350% in 13 years), milk production has become highly concentrated with over 50% of producers in the west of the country: Brittany accounts for 21% of national output, the Pays de la Loire for 15%, and Upper and Lower Normandy for 15%.

### Cattle breeds and their development

The Prim'Holstein breed (the archetype of the high-potential dairy cow) is predominant accounting for 51% of inseminations; it is followed by the Normande and Montbéliarde breeds with around 10% – 11%, and then local breeds, which lag far behind at around 1% and are defined in the designations of origin of French cheeses (Tarine, Abondance, Salers, etc.).

## The composition and quality of the milk collected

French milk producers have now attained such a degree of technical expertise that cattle feed is always appropriate to their products irrespective of changes in weather, and it is extremely rare to collect milk whose composition is imbalanced and which cannot be processed. Furthermore, the support provided by the ARCs (Agents de Relation Culture – *advisory agents*) of the processing firms as regards both milking hygiene and the maintenance and cleaning of milking machines and milk cooling tanks and veterinary care has resulted in the spectacular improvement of the quality of the milk produced in France, which now ranks amongst the European and even the world leaders. Brucellosis and tuberculosis have now been virtually eradicated (less than 0.01% of herds were affected in 2000). At another level, industrialists have introduced an incentive system of milk production bonuses in order to obtain a volume of supply that is as consistent as possible with a view to optimal utilisation of their processing equipment. As a result, the ratio between the maximum and minimum monthly output volume does not exceed 1: 4 (CNIEL, 2006), whereas it is 1: 10 in Australasia. This financial incentive has thus encouraged cattle breeders to spread calving in all regions where fodder production makes it possible. The variation in composition that is inherent in the lactation stage has thus been eliminated at herd milk level and even more so in the case of bulk milk. According to the milk output records (CNIEL, 2006), the average fat content has been stable for the last 10 years and is around 41.8 g.kg<sup>-1</sup>; and following incentives created by the payments system introduced in the 1990s the protein content has increased by more than 1 g.kg<sup>-1</sup>, the average rate being 33.3 g.kg<sup>-1</sup> in 2004.

## Milk payment: hygiene and richness criteria and rules

The basic milk price is laid down annually as a result of inter-trade negotiations held at both the national and the regional level. But legislation specifies that producers must be paid according to milk composition (protein content [PC] and fat content [FC]) on the basis of the weighted mean value (3 to 4 monthly samples), which refers to standard values of 32 g.kg<sup>-1</sup> for PC and 38 g.kg<sup>-1</sup> for FC and a differentiated value per g of PC or FC above or below the standard, the differentiated PC g being valued 2 to 2.5 times higher than the differentiated FC g, the aim being to encourage farmers to produce milk with a high protein content suitable for cheese-making. Payment also takes account of absence of colostrum, any adulteration (cryscopy < 0.506°C), bacteriological quality (< 100,000 UFC.mL<sup>-1</sup>, between 100,000 and 400,000 UFC.mL<sup>-1</sup>, > 400,000 UFC.mL<sup>-1</sup>), somatic cell content (< 300,000 cells.mL<sup>-1</sup>) and, depending on the regional cheeses manufactured, *Clostridium tyrobutyricum* population (< 3,000 spores.L<sup>-1</sup>). The analyses serving as a basis for paying milk producers are carried out by 20 inter-trade laboratories distributed throughout the country; the uniformity and precision of the analyses are regulated by the CECALAIT (a skill centre which monitors milk analyses) based in Poligny. This independent body is responsible for approving the analysis equipment used and periodically recalibrating these 20 laboratories by means of analysis chains based on samples which it prepares.



This milk payment system, which was initially established in 1969 by what is known as the Godefroy Act – is constantly updated by the inter-trade authorities and has resulted in spectacular reduction of the bacterial contamination of the milk collected in France. (In most collection areas over 90% of the milk collected contains bacteria populations of under 10,000 UFC. mL<sup>-1</sup>, i.e. values identical to those recorded in the Anglo-Saxon countries, which serve as a benchmark. Several major processing firms have thus created a new payment criterion corresponding to what is known as “super A” bacteriological quality (< 50,000 UFC.mL<sup>-1</sup>).

## Goat’s and ewe’s milk production

Some 550,000,000 litres of goat’s milk are produced in France and 262,000,000 litres of ewe’s milk. Until very recently, virtually all of this output was processed into raw milk cheeses, but there has been a certain amount of diversification – pasteurised drinking milk, UHT milk (through the authorised use of heat stabilisation salts), yoghurts, butter and cream, powders, etc. in the past few years. The quality and composition criteria for the payment of these small ruminant milks are modelled on those applying to cow’s milk but with the exception of the ewe’s milk produced in the Roquefort production area, where the basic criterion is the cheese yield with tax allowances connected with the losses on sales resulting from the processing of surplus production into other products.

## Structure of the processing sector

### Industrial establishments and their concentration

Almost 900 firms operating in the collection and processing of milk have gone out of business in 11 years as the result of acquisition or merger. But despite this concentration the French milk processing industry is still very diversified, as is the case in other Mediterranean countries (Italy, Spain and Greece), with some 10 large industrial and corporate groups collecting over 70% of the milk produced in France on the one hand and a fabric of a 300 SMEs operating essentially in cheese processing. This type of diversity has disappeared in the other major milk-producing countries in the north of Europe (two enterprises in the Netherlands, one in Denmark and Sweden, and four in Ireland) and in Australasia (one enterprise in New Zealand).

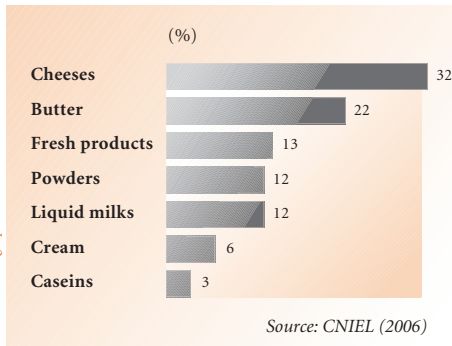
### Processed products

Two main types of technology are used in milk processing, whether it is done on a small or an industrial scale. The simplest technologies aim to stabilise the raw material either by means of heat treatment (sterilisation, pasteurisation, Ultra-High Temperature processing), which destroys the microflora in raw milk and disables many endogenous enzymes, either by reducing water activity – evaporation (concentrated milks) and desiccation (powders) – or through biotransformation of milk sugar, lactose, into lactic acid, which prevents the development of germs entailing a health risk. The period for

consuming milk that has been stabilised in this manner is thus extended for periods ranging from several days (3 days in the case of raw milk at 4°C, 7 days in the case of pasteurised milk) to several months (3 to 6 months in the case of a UHT milk and 6 months to 1 year and more in the case of powders). All other forms of processing use much more complex technologies which always create co-products (skimmed milk, buttermilk, whey, ultrafiltration permeate), which also require more or less elaborate processing depending on the enhancement sought.

Faced with widely publicised hygiene accidents, the milk processing sector has introduced not only rigorous practices for cleaning and disinfecting equipment and premises but also highly effective traceability monitoring, particularly in the microbiology field. The presence of *Listeria monocytogenes* or of *Salmonella typhimerium*, where analytical detection sensitivity has increased over one hundredfold in the last 10 years, has become a very rare occurrence, a fact which can only be reassuring for consumers. At another level, if studies were conducted, the progress made in knowledge of the cattle genome would make it possible to trace links from cheese or any other milk product back up the production chain to the producing animal through the somatic cells, provided that the product in question is not made solely from micro-filtered skimmed milk (since that separating technology actually eliminates the somatic cells).

**Chart 1 - Utilisation of the milk collected, 2005**



12.2% of the milk collected is processed into conditioned liquid milks. Practically all (93%) of these drinking milks, 80% of which are sold as semi-skimmed milk, are sterilised by UHT treatment (140°C-4s). This predominance, which is virtually unique (found in only a few emerging countries such as China), is the result of economic policy measures introduced by governments in the 1950s-1960s. It has also considerably changed younger generations' appreciation of the taste of liquid milk, since they have become increasingly used to the taste of cooked milk. At another level, since European regulations define and authorise the standardisation of the fat content of liquid milks but do not require a minimum protein content (28 g. kg<sup>-1</sup>), actually prohibiting any standardisation of that component (which is absurd in economic and regulatory terms, since producers are paid for their milk on the basis of that very component!), the production of liquid milks has been relocated to the regions in the south to a very large extent, where the milk produced has traditionally a lower protein content.

13% of the milk collected is processed into fresh products, resulting in an output of 1.5 million tonnes of yoghurt and other fermented milks and almost 600,000 tonnes of milk desserts; this output of processed milk is increasing by 5% a year (CNIEL, 2006). Yoghurt

production has remained stable on the whole in the past few years, but within that production item the drop in consumption of classical yoghurts (-10%) has been offset by the increase in the consumption of fruit yoghurts, stirred yoghurts or drinking yoghurts, a field where the four leading manufacturers vie with one another in innovations – such as the type of fruit or even vegetables (rhubarb) added and fat content (0% to 6%). A high growth rate (+ 77%) has been registered for the production of ewe's milk yoghurts, although the volume of output is still low (2,400 tonnes). Goat's milk yoghurt production remains symbolic, on the other hand, probably because goat's milk has a low protein content, which means that the fermented product has a very fluid texture. Producers resolve this problem by using protein-enriched milk either by adding powder or by using membrane ultrafiltration, but this procedure has a considerable economic impact, which consumers cannot accept. As regards fresh milk desserts, sales of rennet milk – one of the leading products of the 1970s – have been plummeting by over 20% per year. Rennet milk is now only produced by a limited number of high-end manufacturers who can comply with the draconian hygiene conditions required for obtaining this product without milk protection. The supply of milk desserts has been diversifying to a very large extent for the last 10 years, on the other hand, with a wide range of flavours and textures (jellied pudding, viscous fluid, mousse, mixed textures) and combinations with pastries.

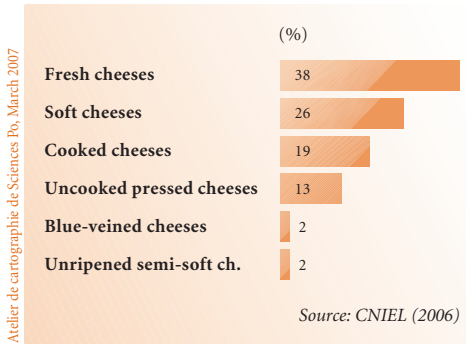
Almost 1/3 of the milk collected is processed into cheese, with a total output of 1,703,000 tonnes. The Chart below shows the proportions of the main categories of cheese manufactured.

The cheese varieties manufactured can be differentiated according to:

- shape and weight: from the mini cheese ball weighing several grammes to the wheel of over 100 kg,
- body: ranging from a runny texture requiring the use of a spoon (Vacherin) and a variety of intermediate degrees of smoothness and elasticity (Pont-l'Évêque, Reblochon, Camembert, Comté, Beaufort, Cantal, etc.) to a texture as hard as stone (very old Mimolette),
- openness: either with no openings (such as Beaufort and Cantal) or with openings varying in size (Comté and Emmental) or veined with moulds (Roquefort, blue cheeses),
- rind features: moulded or bloomy (Camembert, Brie, Sainte Maure), ring-washed and smeared (Pont l'Évêque, Munster, Époisses), with mites (Mimolette)
- milk origin: cow's milk (in the case of several cheeses with registered designation of origin, producing breed and production area requirement), goat's milk and ewe's milk,
- heat treatment: raw, heated or pasteurised,
- fat content: from extra light cheese (fat/dry matter: 10%) to cream cheese (fat/dry matter: 70% and over).

Depending on calculation criteria, between 400 and 1,000 varieties of cheese are manufactured. With such tremendous diversity, which allows consumers not only to eat a different cheese every day but also to include it in every meal and indeed in every dish,

**Chart 2 - Cheeses made in France, 2005**



it is not surprising that French consumers are amongst the major cheese consumers in the world (85% of households eat cheese at least once a day, and, with a per capita consumption rate of 24 kg, France ranks second in the world after Greece.) The progress that has been made in the milk science field, particularly the growth in knowledge of bacterial and fungous metabolism that molecular biology has brought and the major technological advancement achieved with membrane separation technologies (microfiltration and ultrafiltration) constitute new tools

with which cheese processors can enhance the quality of their present products and at the same time create a virtually unending range of new textures and flavours.

There are 42 varieties of cheeses with a registered designation of origin. The individual volumes produced range from 56 tonnes (Banon) to 46,600 tonnes (Comté), with a total output of almost 200,000 tonnes (CNIEL, 2006).

Butter and cream are the result of the processing of 28% of the milk collected. Apart from a limited volume of butters with registered designation of origin (Echiré, Isigny), which are obtained through the traditional method of churning ripened cream, virtually all of French production is obtained by means of the so-called NIZO technique (NIZO being the name of the Dutch milk research institute); this technique consists of churning sweet cream in butter-making machines and thereby adding a lactose-enriched liquor that has been acidified by lactic ferments. In addition to its excellent reproducibility, this technique produces a co-product, sweet buttermilk, which can be easily processed into a marketable product – which is not the case with the acidic buttermilk obtained with the traditional technique. However, it has obviously resulted in the widely uniform taste and texture of French butters. Apart from reducing the fat content from 84% to 51% (with the concomitant addition of texturising milk proteins) and adding crystallisation salt of various origins (sea salt, possibly iodised), the main forms of diversification of butter production have used the fractional crystallisation technique, which results in what are known as “spreadable” butters. Cream production has become widely diversified to meet the demand for cream as a cooking ingredient; this diversification concerns both fat content (from 10% to 60%) and texture (from liquid to very thick or whipped), acidity (sweet creams or sour creams) or heat stabilisation (from fresh cream to UHT cream).

Powdered milk processing uses 12% of the volume of milk collected, with an output of 566,000 tonnes in 2005 (CNIEL, 2006). This low-profit processing activity, for which European aid – whether for export to third countries or for animal feed (calves and

piglets) – is steadily decreasing, has fallen by 25% in the last 10 years. This sharp drop in production is due essentially to a transfer to cheese production, which leads to correlative growth in the production of whey and whey derivatives. Recent innovations (total protein enrichment and partial serum protein removal by a process patented by the INRA – Quibier *et al.*, 1992) aim to improve cheese-processing suitability after reconstitution in importing countries which do not produce enough milk (countries around the Mediterranean and in the Middle East).

Processing milk into butter and cheese produces co-products – buttermilk and whey respectively – which were formerly regarded as by-products which, at best, could be used for animal feed (calves, pigs, piglets) or even spread on land, despite the fact that they contained components of interest for human nutrition. Recognition of the pollution caused (1,000 L of whey have the same polluting capacity as 400 inhabitants) and of the opportunities offered by membrane separation techniques have led to the emergence of a new sector – the whey processing sector. Although general milk powder and the powder resulting from protein extraction, both used in feed for young mammals (calves and piglets) are still the main outlet in volume, the numerous other separated components concern many different fields of human nutrition: protein concentrates or isolates for baby food, nutrition for athletes, or low-calorie slimming diets, ice cream, the meat-salting industry or the biscuit industry; lactose used in pharmacy as an excipient or, after fermentation, processed into ethyl alcohol for beverages (Carbery process) or fuel; Ca salts used to fortify many dietary foods with assimilable calcium; individual proteins such as lactoferrin or lactoperoxydase, which are marketed as substitute antibiotics or even as biological mouth disinfectants in toothpastes, mouthwashes and chewing gums, due to their antimicrobial action.

## **Raw milk products: a Mediterranean speciality**

Although the milk from the udder of the producing animal is very close to sterile, it is very quickly cultured with microorganisms by the environment (milking and storage equipment, airborne flora from food, the atmosphere and the ventilation system of the farm buildings). This contaminating microflora may have no effect at all; on the other hand, it can have a positive effect (the origin of the typicality of the processed products) or, on the contrary, it can be a source of deterioration or, worse, a cause of disease for consumers. In view of this risk, practically all northern European countries have banned all raw milk products from store shelves, whereas, on the contrary, the Mediterranean countries and Switzerland have ardently defended these products, which by their typicality are part of their cultures, traditions and heritage. Some 200,000 tonnes of cheese are produced from raw milk in France, i.e. 30% of total European output. A large proportion of these so-called raw milk cheeses (including all of the cooked pressed cheeses, i.e. the family of gruyères and similar cheeses) present no health risk whatever for consumers for, although the milk placed in the cheese vat is unheated milk, the processing process comprises heating the curds and whey mixture at 55°C for 60 minutes; this heat treatment is as intensive or even more intensive than that involved in

pasteurisation. This is not the case with soft or semi-soft cheeses, whose consumption must on no account present the slightest risk for consumers. In view of this requirement, which is legitimate to say the least, the milk industry and research bodies have developed measures for identifying dairy farms presenting a risk – measures which have been facilitated by the increase in sensitivity ( $\times 1000$ ) of the methods for detecting a large number of pathogenic bacteria – and have set up the system for analysing and monitoring food hazards known as the HACCP (Hazard Analysis Critical Control Point) in numerous cheese parlours. And finally, after heated debates launched by producer structures, the administrative authorities provisionally authorised the use of membrane microfiltration systems for all AOC products in 2002 (for 5 years), but with the requirement that the products be labelled; this bacterial purification technique is a separation technology involving heat treatment at 37°C (Saboya and Maubois, 2000). This authorisation of the use of membrane microfiltration nevertheless requires intensive research so that the microbial components of each of the ecosystems creating the typicality of the body and flavour of each AOC cheese can be defined in full. To judge by our own experience in this field, this can involve three years of work per researcher for each type of AOC cheese.

## Likely developments

In view of the restructuring measures that have already been carried out, the decrease in the number of dairy farms (-5% per year) should slow down and level off at a total of around 80,000 – 85,000 farms with an average herd size of between 40 and 100 cows. Dairy farms structured as companies (GAECs [collective farming groupings] or EARLs [limited liability agricultural holdings]) accounted for only 30% of production structures in 2001, but the number of such farms is likely to increase rapidly and will probably exceed the 50% mark due to the marked rejuvenation of the age pyramid and the new dairy farm managers' legitimate aspiration for better quality of life. The dairy specialisation of the regions of the Atlantic coastal front (Nord-Pas de Calais, Normandy, Brittany, Pays de Loire) and the mountain regions (Rhône-Alpes, Auvergne, Champagne-Ardenne) is likely to develop further. Except for the breed obligations laid down in the regulations on registered designations of origin for cheeses, the predominance of the Frisonne-Holstein breed will probably increase but with one exception in the mountainous areas, where local breeds will probably be replaced more and more by the Montbéliarde breed, a factor which raises questions as to the consequences for the typicality of dairy products.

Given the current French and European farm gate prices for milk (virtually twice the price paid to producers in New Zealand, Australia and Argentina), the French and European milk industry is not and will not be competitive on the world staples market (liquid drinking milks, butter, powders or their AMF derivatives, caseins, caseinates, etc.). The idea of introducing a double production quota (European price harmonised on the basis of the 1983 production reference and the price defined by the world staples rate for surplus quantities produced) in order to reduce the production cost of

these staple commodities has been put forward and debated but the difficulties encountered in implementing the system in actual practice were so great that it was abandoned. The reform of the CAP is geared to adjusting quotas to the trend on European and world markets. The French milk processing industry thus has no choice but to diversify its current products by adapting them to developments in domestic consumption (loss of meal structures; more snacks; creams, butters and cheeses as cooking ingredients) and to the foreign demand of solvent countries (Europe, oil producers) and to innovate in order to respond to the underlying trends (in particular the health connotations) with regard to the consumption of milk derivatives in the medium term.

The concentration of the French milk industry is likely to continue with the takeover of many medium-sized enterprises by the large dominant groups but is unlikely to attain the high level of concentration in northern European countries or Australasia, which can act as a curb on both product creativity and process innovation and can also lead to the virtual disappearance of state milk science research as has been observed in the United Kingdom, Denmark and several other countries (in particular New Zealand). A large number of takeovers by French companies are also to be expected in the former Eastern European countries which are now EU member states, due to the obsolescence of industrial plants in those countries, which seriously reduces their economic competitiveness. And finally, forms of association will probably also develop in the near future with milk processing structures in emerging countries (particularly India and China).

In the production systems established in the course of external growth operations of this nature the fact that consumers in those countries have tastes and eating habits that are very different from those of French or even European consumers will of course have to be taken into account. Chinese consumers who have only chopsticks at home would have great difficulty eating firm yoghurt or hard cheese! Similarly, they are unlikely to be attracted to a bloomy cheese at first sight, since, in the Chinese subconscious, mouldy = rotten! To give another illustration from a Mediterranean country, the flavour sought by an Egyptian cheese enthusiast in a cheese variety called “Ras” would more than surprise even the most selective of French cheese lovers.

## **The structure and development of consumption with the impact of health connotations**

### **Liquid milk consumption and trends**

The consumption of liquid milks has dropped by over 10 L per capita in the course of the last 10 years (CNIEL, 2006) and is now around 65 kg *per capita*, i.e. far behind Ireland (158 kg) and even behind Algeria (75 kg), and semi-skimmed UHT milk predominates (80%). Unless there is a spectacular reversal of trend, French consumers' loss of interest in drinking milk is liable to continue due to the fact that the product has become commonplace and is regarded by chain stores as a loss leader despite the efforts made by the processing sector to offer a wide range to meet demand in “nutrition niches” such as:



- hydrolysed lactose milk to meet the needs of persons who are allergic to milk sugar
- mineral-enriched milk: Ca, Mg, Fe, Zn intended essentially for juvenile or senior nutrition
- fibre-enriched milk intended to facilitate bowel movement
- milk enriched with fat which has high omega-3 fatty acid content (fish oils, for example) or from cows fed with a source of that acid (essentially linseed)

or in market niches with flavour, regional and ecological connotations such as that sought by raw milk enthusiasts, where the shelf life (3 days, according to the regulations) can be extended to up to 2 weeks by membrane microfiltration treatment, which is now officially authorised (Saboya and Maubois, 2000).

This “soft” bacterial purification technique is not only used in order to prolong the shelf life of raw milk but is also used to prolong that of pasteurised milk to 5 weeks (Saboya and Maubois, 2000). Contrary to heat treatment techniques, which leave “bacterial corpses” in the milk with their enzyme deterioration potential and heat-resistant cellular forms (spores), this technique separates, and thus removes, virtually all of the microorganisms (99.9%) from the milk. However, its use in France is unlikely to reverse the inexorable pasteurised milk market decline (-3% a year), contrary to the trends observed in many other countries (Canada, United Kingdom, Scandinavia and even Argentina), where pasteurised microfiltered milk is gaining a dominant market position.

## Fermented milk consumption and trends

The consumption of fermented milks has increased by almost 20% in the last 10 years, levelling off in the last 2 or 3 years around 21 kg per capita, which is the equivalent of 168 cartons of yoghurt. The current diversification of classical products involves flavouring and the addition of pieces of fruit and cereals.

By using probiotic ferments (*Bifidobacterium breve*, *bifidum* or *longum*, *Lactobacillus casei*, *Lactobacillus GG*, *Lactobacillus helveticus*), prebiotic ferments (food components which are not digested but which stimulate the growth of specific microorganisms in the digestive flora), fructooligosaccharides (FOS), galactooligosaccharides (GOS) and inulin, the processing industry is taking advantage of the health connotation of fermented milk, which has been engraved in the collective memory since Metchnikoff's research (1908), and it will continue to do so.

It is highly likely that other health allegations will be made in the near future for fermented milk, which is regarded in Europe as the best nutraceutical milk vector, on the basis of current clinical studies on:

- Cardiovascular activities: (1) anti-hypertension activity of peptides which inhibit the ACE (Angiotensin Converting Enzyme) and are the result of proteolysis of most milk proteins, but the most active seem to be those resulting from hydrolysis of  $\beta$ -casein, known as  $\beta$ -casokinins; this anti-hypertension allegation is already being



made in Japan and Finland in the case of milk that have been fermented with strains of *Lactobacillus helveticus*; (2) anti-thrombotic activity of peptides known as caseo-platelines, which inhibit platelet-blood-fibrinogen aggregation and are the result of trypsin hydrolysis of the N-terminal of caseinomacropeptide (CMP), a fragment of  $\kappa$ -casein.

- The activities of regulating food intake and digesting fats by adding this CMP to fermented milk, which has been shown to induce the secretion of cholecystokinin in man, a digestive hormone which regulates the contraction of the gall bladder and the secretion of pancreatic enzymes, thus influencing the sensation of satiety (Portman, 2004).
- Anti-stress activity through a peptide resulting from hydrolysis of  $\alpha_{S1}$ -casein (91/100 fragment) known as casozepein, because it has a benzodiazepin-type activity – demonstrated on animal models and human volunteers (Bresson *et al.*, 2000).
- Immunomodulatory activity either through peptides resulting from  $\beta$  and  $\kappa$ -casein,  $\alpha$ -lactalbumin or lactoferrin hydrolysis or through the metabolism resulting from the incorporation of strains of *Lactobacillus casei*, which can regulate the production of the cytokines released during bowel inflammation, into fermented milks.
- The morphinomimetic activity of peptides, which are known as casorphines or lactorphines, depending on their hydrolysis substrate, and which act as opiates on bowel motility and the central and peripheral nervous systems (sedative and analgesic effects): according to numerous studies published in the past few years, the most active peptides are those resulting from  $\beta$ -casein, and in particular an amide derivative called morphiceptin, which is formed *in vivo* in the bowel.

## Butter and cream consumption

Butter consumption has dropped by 10% over the last 10 years, levelling off at around 7.5 kg per capita, which makes French consumers the leading world consumers of this sort of animal fat, although this does not bring a high level of cardiovascular deaths – much to the bewilderment of US nutritionists, which is summed up in the expression “the French paradox”. The intensive research that has been continuing for several years on both the structuring and organisation of dairy product fat (very different to those of other lipid sources) and any positive bioactivity of several components of milk fat could soon result in the rehabilitation of this component, which has long been “demonised” by the medical world. It is actually possible to increase the content in CLA (conjugated linoleic acid)-type fatty acids – either through the feeding stuffs fed to the producing animals or by means of selective fermentation; these fatty acids have been shown to be anti-atherogenic and probably anti-carcinogenic (Parodi, 2003). At another level, careful examination of the milk fat consumption audit reveals that cream consumption has increased by over 20%, with the result that, taken as a whole, there has been virtually no variation in milk fat consumption over the same period of time. This increase in cream consumption is the result of the very wide range of cream products for use as a cooking ingredient.

## Cheese consumption and possible future trends

France ranks second in the world with a per capita cheese consumption rate of over 25 kg. In view of the level already achieved it is unlikely that consumption will increase to any great extent in terms of quantity, but if that consumption level is to be maintained manufacturers will certainly be competing with one another in creativity in terms of texture, flavour, coating and presentation by using scientific progress particularly in the field of controlling microbial ecosystems in the acidification and ripening processes. It is also to be expected that the use of cheese as a cooking ingredient will develop with an increased supply of grated products for using with pasta or pizzas (over 50% of emmental production), mozzarella-based liquid products probably bringing a significant increase in mozzarella output, and products intended for accompanying salads or for use in sauces and soups. As regards processes, a general integrated approach to cheese processing which optimises both cheese yield and whey enhancement by means of 0.1  $\mu\text{m}$ -membrane microfiltration of the manufacturing milk (Maubois *et al.*, 2001) should become widespread, at least in large-scale plants. Except for the production of fat content and the addition of assimilable calcium, the health connotation of cheese will probably be slower to become established than that of fermented milk, for several reasons: the mainly hedonic and festive concept of the product and the extreme complexity and diversity and constant variability of cheese matrices over time, which makes it extremely difficult to interpret the results of clinical studies conducted on human volunteers.

## Derivatives: classical ingredients, current and future functional foods (neutraceuticals)

The consumption of molecules derived from milk is liable to increase considerably both in the case of technical-functional uses – native calcium phosphocaseinate replacing caseinates (texture and buffering capacity), whey protein isolates for their foaming properties or enriched with  $\beta$ -lactoglobulin (gelling) – and in the case of qualitative improvements of the current formulations – e.g. baby foods which are  $\beta$ -lactoglobulin-free (because of its allergenicity) but enriched with  $\alpha$ -lactalbumin. If the development of European regulations on functional foods permits and simplifies the procedure, basing it on a model other than the drug procedure model – for the objective of health foods is not therapeutic but to preserve the health of human beings –, then many so-called minor molecules (because only very small quantities are present in milk), except for the bioactive peptides mentioned above in the context of future fermented milks, will probably be proposed to consumers who are anxious to maintain good health through nutrition. Without entering into an exhaustive review of current research and studies, we would mention the following products:

- products for combating osteoporosis: osteopontin, Cystatine C, Milk Basic Proteins (MBP), a complex of three whey proteins acting on both bone resorption and biosynthesis (Takada *et al.*, 1997); multi-purpose products, such as growth-factor-enriched products (Gauthier *et al.*, 2006) acting as cosmeceutics such as TGF- $\beta$ ,

which has an anti-psoriatic effect (Jouan *et al.*, 2001) but also acts at the gastrointestinal level;

- > products stabilising the development of Alzheimer's disease such as the polypeptide isolated from colostrum by Leszek *et al.* (1999);
- > products increasing immune defence: "serocolostrum"-purified immunoglobulins (Piot *et al.*, 2004).

## Conclusions

Milk is undeniably a liquid food that is unequalled in Creation for human nutrition. Millennial observation and experimentation has led to a quite extraordinary range of derivatives, which meet both the vital needs of young mammals at birth (a particularly critical period of life) and the constant pursuit of hedonic pleasure of all the other categories of consumers. Scientific and technical advancement has made it possible both to supply products which offer a high level of hygiene safety and have much longer shelf lives, and whose organoleptic quality is increasingly diversified and constantly improving. The recently acquired knowledge of the biological activities of milk components will probably encourage the milk sector to take up a new challenge – that of the health connotation of food. To do so, further knowledge of the metabolism of the probiotic bacteria that are added to the milk or cheese environments will be necessary, and leading edge technologies for separating and purifying target molecules will have to be introduced, profitable uses will have to be found for the co-products that are necessarily generated, and new partnerships will have to be created with teams of medical physiologists which can demonstrate beyond all doubt the nutraceutical activities sought.

It is only by mobilising all of the actors involved in milk research in France and by refocusing research activities that that challenge of acquiring knowledge and developing the products supplied through processing can be met – and those products will of course have to remain festive in hedonic terms. But although given the excellence of the knowledge and technical expertise of all of the actors in the French milk sector the industry is well placed to play a major role in the above field, abundant research funding will have to be provided. The cost of the heavy research equipment which is absolutely essential for the studies to be conducted as well as the cost of the clinical trials to be carried out is so high that it cannot be financed by enterprise, not even by the biggest firms. It can only be covered by joint state-industry financing through structures such as those of the "competitive clusters" which have recently been set up.

The directors of the large research bodies involved in the above-mentioned programmes will also have to devote particular attention to the recruitment of scientific staff. As a priority, measures must be taken to train and use both microbiologists who can use the knowledge recently acquired in the field of molecular biology and apply it to gain better knowledge of the microbial ecosystems of milk biotransformation, and technologists capable of a global approach and highly cognitive of both the processes and the products and co-products generated and are thus in a position to specify the

biochemical state and purity of the molecules studied to their partners from the medical or pharmaceutical world involved in clinical studies on nutraceutical effectiveness.



# MILK AND MILK PRODUCTS IN ITALY

area policies and Europeanisation

*Daniele Rama*

## Can one speak of an Italian milk policy?

Although Italy has traditionally had an agricultural policy – albeit increasingly limited through its membership in the European Union – there is regrettably no agro-food policy and thus no milk policy. The efforts to elaborate an autonomous Italian agricultural policy date back to the 1970s with the “Marcora Plan”, which was named after the then well-known minister of agriculture. That plan was based on the severe national agro-food deficit, which was aggravated by the oil crisis and its repercussions in the form of rising world raw materials prices; its main aim was thus to remedy this deficit. It was implemented in the so-called “Quadrifoglio” (four-leaf clover) Act in 1977, which made provision for intervention at the sectoral level in four fields including the milk and milk product sector as well as two cross-sectoral regional or support measures aiming essentially to boost production: the target figure for the increase in gross agricultural output being 2.5% per year.

The subsequent plans implemented in the 1980s and 1990s were geared to the objective of supporting farm incomes, which were regarded as a driving factor for developing agricultural enterprises, with four secondary objectives: to conserve land use, to restore regional balance and protect the natural environment, to reduce the trade deficit and to implement the policy for promoting the Mezzogiorno region. One notes that these plans do not broach agro-food policy, whose objectives would be to reduce the social cost of food, to guarantee product quality, to develop research, training and information in the agro-food system, and to improve coordination amongst the various factors and levels of the system. The policies for regulating the milk sector in Italy have been the result of the application of two sets of regulations; the first is cross-sectoral and concerns standards and quality marks in the agro-food sector, and the second is supranational and is related to the Common Organisation of the Milk Market and more generally the reform of the Common Agricultural Policy.

## The official milk and milk product quality marks

It should be pointed out first of all that Italy produces 31 Protected Designation of Origin (PDO) cheeses plus one Traditional Specialty Guaranteed (TSG), “Ricotta Romana”; the latter has been produced since 2005. With its 31 cheese designations it

ranks second after France in terms of the number of PDOs produced (Table 1). In terms of quantities of PDOs produced, Italy is in the lead with over 450,000 tonnes of cheese.

Production is highly concentrated, however, the first leading cheeses accounting for almost 90% of total PDO output. Due to marked differences in quality and the considerable quantities marketed, the management of the production and marketing of this large number of “small niche products” is extremely problematical.

**Table 1** - Italian PDO cheeses in 2005

Cheese	Region	Production 2005 (tonnes)	Var. % 2005/2004	% of PDO total	Cumulative % of PDO total
Grana Padano	Piedmont, Lombardy, Veneto Emilia-Romagna, Trentino-South Tyrol	159,621	+7.0	35.2	35.2
Parmigiano Reggiano	Emilie-Romagne, Lombardy	118,979	+1.8	26.2	61.4
Gorgonzola	Piedmont, Lombardy	48,481	+1.8	10.7	72.1
Mozzarella di Bufala Campana	Campania	29,590	+7.9	6.5	78.6
Pecorino Romano	Sardinia, Latium	23,855	-37.5	5.3	83.9
Asiago	Veneto	23,617	+3.4	5.2	89.1
Provolone Valpadana	Lombardy, Emilia-Romagna	12,745	-5.4	2.8	91.9
Taleggio	Lombardy	9,196	-3.7	2.0	93.9
Montasio	Friouli-Venezia Giulia	8,191	+4.7	1.8	95.7
Fontina	Aosta Valley	4,647	+3.3	1.0	96.8
Quartirolo Lombardo	Lombardy	3,428	-1.0	0.8	97.5
Pecorino Toscano	Tuscany	1,870	-0.5	0.4	97.9
Pecorino Sardo	Sardinia	1,760	+11.4	0.4	98.3
Valtellina Casera	Lombardy	1,370	-7.7	0.3	98.6
Toma Piemontese	Piedmont	1,148	-10.7	0.3	98.9
Caciocavallo Silano	Calabria, Basilicata	1,120	+13.1	0.2	99.1
Raschera	Piedmont	786	-10.8	0.2	99.3
Bra	Piedmont	775	-7.4	0.2	99.5
Monte Veronese	Veneto	538	+29.4	0.1	99.6

Tableau 1 - (contd.)

Fiore Sardo	Sardinia	530	+13.7	0.1	99.7
Bitto	Lombardy	340	-2.9	0.1	99.8
Ragusano	Sicily	254	+93.9	0.1	99.8
Casciotta d'Urbino	Marche	240	0.0	0.1	99.9
Castelmagno	Piedmont	208	+33.3	0.0	99.9
Spessa delle	Trentino-South Tyrol	133	+54.7	0.0	100.0
Formai de Mut	Lombardy	61	+8.9	0.0	100.0
Canestrato Pugliese	Apulia	34	74.4	0.0	100.0
Robiola di	Piedmont	26	-73.5	0.0	100.0
Murazzano	Piedmont	26	+44.4	0.0	100.0
Pecorino Siciliano	Sicily	16	+11.6	0.0	100.0
Valle d'Aosta Fromadzo	Aosta Valley	3	0.0	0.0	100.0
<b>Total PDO cheeses</b>		<b>453,588</b>	<b>+0.4</b>	<b>100.0</b>	<b>100.0</b>

Source: Elaboration and estimations based on Ismea data, and data elaborated by the Tutèle and Assolatte Consortiums.

As regards the various types of milk we would cite Act 169/1989 and directives (EC) 89/395 and 89/396, which make a distinction between three types of milk according to raw material, heat treatment and analytical parameters:

- “pasteurised milk” (a staple which is rarely found on the market),
- “fresh pasteurised milk” (only one pasteurisation treatment),
- “high quality fresh pasteurised milk” (with stricter standards concerning composition, freshness and hygienic characteristics of the raw material).

## Production management and implementation of the reform of the Common Agricultural Policy

In 1983, when the Council of Ministers of Agriculture of the European Community decided to apply the quota system to the milk sector, milk production in Italy was highly fragmented but the first signs of a concentration process were beginning to emerge: the average size of a dairy farm was approximately 10 cows per byre, whereas the number of producers dropped by over half in the course of the following decade at an annual rate of decrease of 8% – which was two points higher than the Community average. It was feared that the individual quota system would curb this development and that it would be difficult to get producers to accept strict limitation of production in an agricultural sector with a high output deficit (the self-supply rate of the market was around 70%); these fears led the Italian government to request “special” rules for applying the milk quotas (and these rules were in fact also applied in the case of Greece). Italy was



thus regarded as one single production area, in which quotas were not allocated individually, and the government was made responsible for monitoring observance of the “Guaranteed Total Quantity” (the national quota).

In 1992, when it was realised that the system for controlling production in which producers were not individually responsible was ineffective, a system of producer quotas was applied pursuant to Act 468/92; each producer was given an “A” quota equal to his 1983 output plus a “B” quota, which corresponded to any positive difference between output in 1991 and output in 1988. The AIMA, the agency of the Ministry of Agriculture (now called the AGEA) could decide to carry out a unilateral reduction of the B quotas without compensation in order to bring the Guaranteed Total Quantity and the total of the individual quotas allocated to the same level within five years. A certain degree of ambiguity persisted in the application of these standards. Producer discipline was weakened and when penalties were applied for exceeding quotas the producers who were penalised applied to their respective Regional Administrative Courts – with the immediate effect that the implementation of the penalty was stayed. A succession of statutes followed over the next few years, the most recent being Act 119/03, which made the application of the penalties for exceeding milk quotas more stringent. At the same time the system for exchanging quotas between producers was relaxed.

The introduction of the mid-term review of the CAP left it to the member states to determine the extent to which aids for agricultural production would be decoupled with a view to separating production from income aids. Several solutions were adopted; France decided to apply partial decoupling in order to limit any destabilisation of regional balances, Germany decided to apply the decoupling immediately with a hybrid system for applying aids; part of those aids is calculated at farm level on a reference basis and another part is regionalised, one single amount being granted per hectare within the same region. Italy has now adopted total decoupling in 2006, but the aid is calculated per farm on the basis of references. The provisions that were adopted established that aid would be proportionate to the quota used by each producer: thus a producer who produced more than his quota would only receive aid for the products under quota, whereas a producer who produced less than his quota would receive aid based on his actual output.

## Market size and value chain

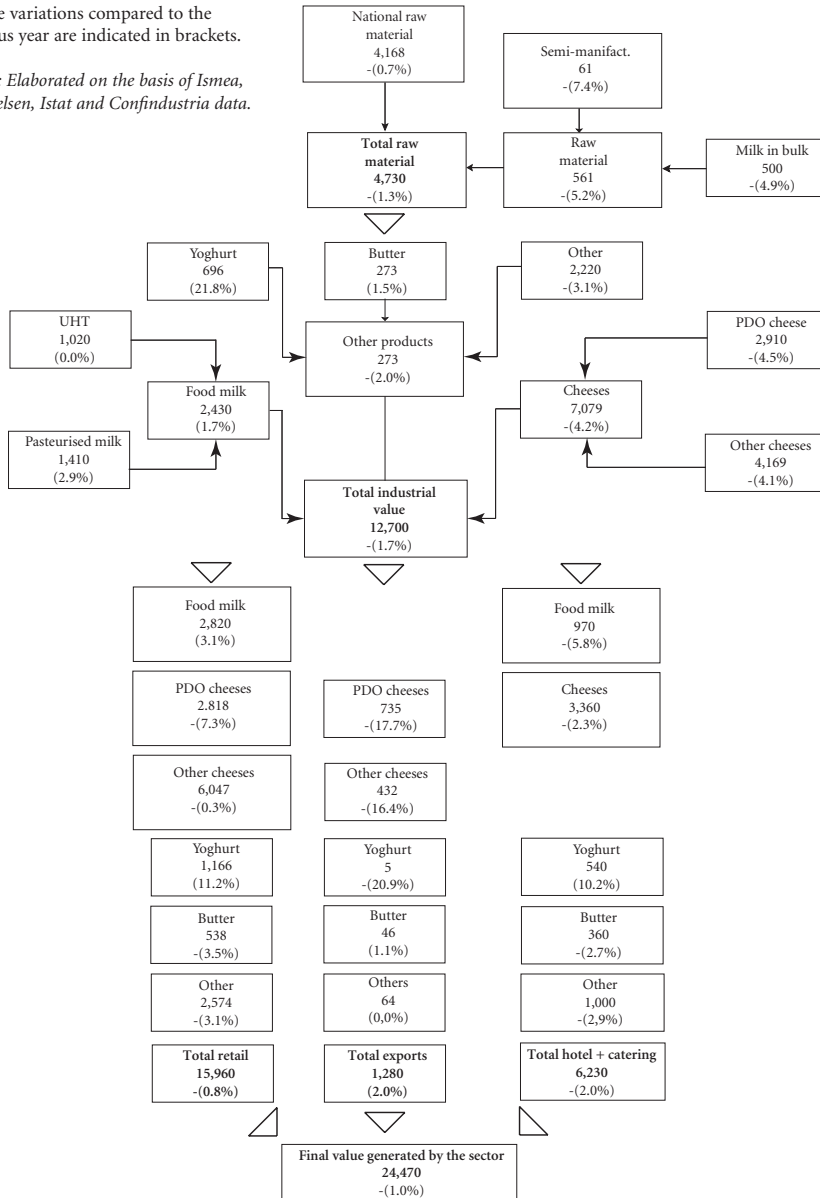
In 2005, the total value of raw material in the Italian milk sector was 4.2 billion euros, to which the value of imported raw material, 561 million, must be added (Chart 1). The factory price value of the industrial output marketed amounted to 12.7 billion, i.e. a net industrial value added of some 8 billion. The final turnover generated by the sector was over 23.4 billion, so that the gross distribution margins amounted to 10.7 billion. This turnover is broken down as follows: retail trade 68%, hotel and catering trade 27%, and exports 5%.



**Chart 1 - Chain of value in the Italian milk industry in 2005, in million euros\***

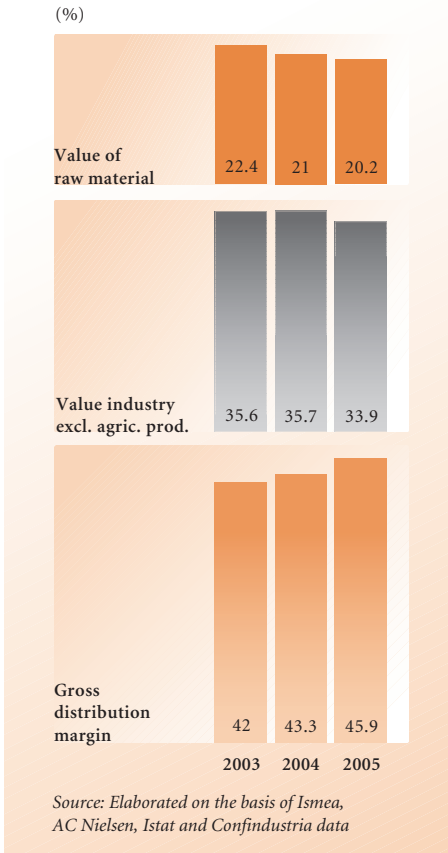
(\*) The variations compared to the previous year are indicated in brackets.

Source: Elaborated on the basis of Ismea, AC Nielsen, Istat and Confindustria data.



The development in turnover shows an increase of 3% compared to 2004 and of 5% compared to 2003. This progression was achieved mainly in the distributing sector; the respective shares of the milk industry and, in particular, the agricultural sector are decreasing, with a drop in the value of farm milk of 5.6% between 2003 and 2005 (Chart 2).

**Chart 2 - Distribution of value in the Italian milk industry, 2003-2005**



Atelier de cartographie de Sciences Po, March 2007

The national milk industry used almost 12.5 million tonnes in 2005, 1.7 million tonnes of which came from other countries, to produce some 2.9 million tonnes of drinking milk, 1.2 million tonnes of cheese (some 230,000 tonnes of which were exported), 282,000 tonnes of yoghurt and other types of fermented milk, and 122,000 tonnes of butter.

Some 70% of the total volume of milk available is used to produce cheese; 55% of the cheeses produced fall under the 31 PDO designations, so that the PDO cheese system absorbs almost 39% of the milk available to the Italian dairy industry or 44% of the milk collected in Italy.

Within the drinking milk sector the values of UHT milk and pasteurised milk are approximately equivalent; in terms of quantity, UHT milk amounts to only 13% of the milk available, whereas pasteurised milk amounts to 10%. When one examines the amount of milk that is processed into PDO cheeses, it can be said that some 50% of Italian milk is used by that sub-sector.

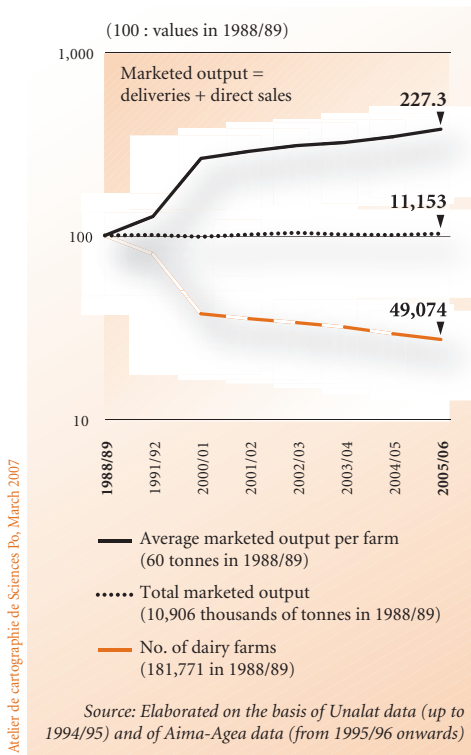
## Milk production is restructuring

During the 2005/2006 farm year (which ended on 31 March 2006), marketed milk output<sup>1</sup> per se (i.e. before correction on the basis of fat) increased by 1.2% after two years of downward trend: -1.8% in 2004/2005 and -0.8% in 2003/2004 (Chart 3). It thus again exceeded 11 million tonnes.

The drop in production in the period from 2003 to 2005 had been regarded as a positive sign of better adaptation to the system for managing milk deliveries defined by Act 119/03. This was a system for adapting production structures to the change in quotas

<sup>1</sup> - Marketed output is defined as the sum of “deliveries” (quantities of milk delivered to the processing industry) and “direct sales” (quantities processed on the farm and sold as milk products). This aggregate thus does not include the quantities which are used on the farm and are not marketed – for feeding the producer and his family, young animals, and so on. It is thus the volume taken into account for applying the milk quotas.

**Chart 3 - Number of dairy farms and marketed output of cow's milk in Italy, 1988/89-2005/06**



Atelier de cartographie de Sciences Po, March 2007

implemented by the Act with a view to decoupling producer aid. The increase registered in 2005/2006 was also related to decoupling, the 2005/2006 farm year having been taken as the basis for calculating decoupled aids. Producers tried to avoid any under-utilisation of the quotas—hence the increase in production.

The number of dairy farms continued to decrease steadily (-6.8% in 2005 compared to 2004). In the last eight farm years this rate of decrease has ranged between -9.6% in 2000/2001 and -5.3% in 2002/2003. The number of dairy farms thus dropped from 81,553 in 1998/1999 to 49,074 in 2005/2006, whereas they had totalled 182,000 ten years previously.

Average output per farm is increasing: rising from 60 tonnes per year in 1988/1989 to almost 130 tonnes 10 years later and to 227 tonnes in the last farm year, which was an increase of 9.6% compared to the previous year.

One of the consequences of the quota system has been the increase in the share

of marketed output. Whereas the share of milk processed on the farm and marketed as dairy products was between 3% and 4% at the beginning of the 1980s, a large number of these dairies attached to farms have closed down as a result of the quota system. During the second half of the 1990s the share of milk processed on the farm was 1.5%, and this percentage increased slightly after the year 2000, amounting to 2.6% in the past two farm years. This inversion of the trend is to be attributed to a number of producers to whom the quota rules do not apply for structural reasons and who have decided to process all or part of their milk output directly in order to take advantage of the higher margins obtained on direct sales.

The figures available on quota trading show that in 2004/2005 such trading only concerned 11,500 farms with an output of 1.4 million tonnes (Table 2). Inter-regional quota trading concerned only 80,000 tonnes (approximately 6% of the total). In virtually every case the quotas were purchased by producers in Lombardy (where almost 40% of national production is located), whereas the quotas came mainly from Campania (25,000 tonnes), Latium (21,000 tonnes), and Venetia (18,000 tonnes).

**Table 2** - Exchange of milk quotas between producers in Italy, 2002/03- 2004/05

	Producers concerned			Quantity (1,000 tonnes)		
	2002-2003	2003-2004	2004-2005	2004-2005	2004-2005	2004-2005
Farm inheritance	321	992	1,646	51.3	125.6	267.3
Purchase of quotas	3,132	3,650	5,062	212.0	280.0	531.9
Lease of farm + quotas	1,875	1,647	1,252	218.3	239.3	179.8
Lease of quotas without land	3,179	5,889	5,293	202.2	409.2	403.9
Other	465	381	253	54.5	47.3	32.4
<b>Total</b>	<b>8,040</b>	<b>10,833</b>	<b>11,439</b>	<b>738.2</b>	<b>1,101.4</b>	<b>1,415.3</b>

Source: Elaborated on the basis of Agea data.

## A bipolarised processing industry

The Italian milk processing sector is one of the most fragmented in the European Union: in 2004 there were some 1,673 units operating in the sector (or at least in the heat treatment of milk for producing food milk), the majority being small units which collect an average of 2,000 tonnes of milk year. The number of these small units is tending to decrease, whereas there is an upward trend in the number of medium-sized or large units (Table 3).

### The wave of takeovers and concentration

A large share of the turnover in the milk sector is controlled by a limited number of large groups, which are often subsidiaries of foreign companies. It is mainly within this limited club that concentration is progressing through mergers and takeovers. A development in recent years has been the growth of the Parmalat Group, which before the crash in 2004 considerably diversified its activity by developing a large pasteurised milk production and distribution pole in addition to its classical production of UHT milk through the takeover of Carnini in 2001 and of the Eurolat group (with the historical trademarks such as Polenghi, Giglio, Sole, Matese and Torre in Pietra) in 2003. The other major actor on the food milk market, the Granarolo co-operative, in turn took a major step by taking over the “Centrale del latte di Milano” in 2000 for almost 130 million. Four years later, the same group effected a further takeover for 20 million, absorbing Yomo, the pioneer of yoghurt distribution in Italy which had been the market leader for many years and had remained a family firm until then.

One of the rare takeovers by cooperative groups was effected by the Unigrana group in Modena, which bought out Parmareggio in 2004 for some 7 million euros.

**Table 3** - Production units operating in milk treatment and/or processing in Italy, 2001-2004

	Small units		Medium-sized – large units		Total	
	no.	Milk collected (1,000 tonnes)	no.	Milk collected (1,000 tonnes)	no.	Milk collected (1,000 tonnes)
2001	1547	3,071	191	6,344	1738	9,415
2002	1528	3,007	206	6,383	1734	9,390
2003	1498	2,843	209	6,332	1707	9,175
2004	1465	2,854	208	6,394	1673	9,248

Source: Elaborated on the basis of ISTAT data.

Note: Units collecting less than 10,000 tonnes of milk per year are classed as “small units”; those exceeding that threshold are classed as medium-sized – large.

The biggest upheaval took place in the traditional cheese sector with the French group Lactalis, which entered the Italian scene in 1988 (under the denomination of Besnier) by buying Nestlé’s subsidiary Locatelli and then bought Invernizzi from Kraft in 2003. Further takeovers followed in 2005 and 2006 making the Lactalis group the continental milk market leader (overtaking Arla Foods) with strong concentration on the Italian cheese market, where the Laval group ranks third after Kraft (Table 4).

The result of this wave of takeovers is measured by concentration coefficients, which are generally high on the various markets (Table 5). It is remarkable that a market like the pasteurised milk market, which was formerly dominated by small or medium-sized local enterprises including the “Centrali” belonging to the municipalities (which had the monopoly until the early 1970s) should end up with a Parmalat-Granarolo duopoly accounting for almost two-thirds of turnover. The degree of concentration is also considerable in the UHT milk and yoghurt sector (where it is gathering momentum due in particular to the leader Danone, which holds the only two-digit share of the market, and to Granarolo, which ranks fourth after Mueller and Nestlé. In the case of fresh cheeses, where Galbani holds almost 20%, Kraft’s ailing position (dropping from 11% to 8% in one year) is offset to some extent by the third actor, Lactalis (rising from 2.7% to 5.4%). There are no dominant positions on the soft or semi-soft cheese market (because these are really different and quite distinct markets) or on the butter market -butter is not a strategic product in the Italian milk system. The hard cheese sector is not presented in this table since it is dominated by small dairies, which are often first-level cooperatives (and are thus managed directly by the milk producers); the leading producer accounts for just under 7%.

Although the main milk enterprises are fairly specialised, holding a pre-eminent position for one or two categories of products, there are several exceptions (Table 6) such as the multi-product group Granarolo, which operates in almost all segments, and Parmalat, whose production is diversified to some extent.

**Table 4 - Total turnover and total cheese turnover of the principal Italian enterprises in the cheese sector**

Enterprise	Total turnover 2004 (million euros)	Total cheese turnover 2004 (million euros)	Cheeses	% of hard cheeses	% of semi-soft and soft cheeses	% of fresh cheeses	% of processed cheeses
Galbani	1 124.0	844.0	Mozzarella, Mascarpone, Crescenza, unripened semi-soft cheeses, Gorgonzola, Italico, Ricotta	1.6	21.7	70.5	6.2
Kraft Foods Italia	623.3	311.5	Spreading cheeses, cottage cheese, Emmental-type, Robiola, Primosale	-	2.2	60.7	37.1
Lactalis Italia	240.0	197.3	Mozzarella, Mascarpone, Crescenza, Gorgonzola, Taleggio, Brie	-	21.0	75.8	3.2
Lat Bri	124.0	121.6	Mozzarella, Mascarpone, Ricotta	-	8.2	91.8	-
Auricchio	102.4	102.1	Provolone, Pecorino	21.1	78.9	-	-
Granarolo	851.9	101.1	Mozzarella, Ricotta, Mascarpone	11.1	4.5	80.5	3.9
Bel Italia	89.6	86.2	Mini Baby Bel, Leerdammer	-	89.7	6.8	3.5

Source: Databank.

## Marketing strategies in the various segments

As regards drinking milk, competitive strategies are geared more to the product; in the case of both pasteurised and UHT milk great attention is devoted to the quality, and even the “Italian-ness” of the raw material – and in the case of pasteurised milk consumers are even offered “milk from their own region”. This lever is complemented with a wide range of products including special products: milks enriched with functional elements such as vitamins, coenzymes, etc., flavoured milks, highly digestible milks, etc.

A further differentiating factor is the container: even in the case of UHT milk the traditional brick has now been almost completely replaced by reclosable packages such as

**Table 5** - Concentration coefficients in the Italian milk industry, 2004-2005

Subsector	2004		2005	
	CR2	CR4	CR2	CR4
Pasteurised milk	64.1	70.1	63.5	69.5
UHT milk	44.3	53.7	45.9	53.8
Yoghurt and desserts	33.1	44.5	33.6	50.4
Butter	20.4	31.4	21.9	33.6
Fresh cheeses	29.8	35.4	26.9	35.6
Soft and semi-soft cheeses	12.7	21.3	12.2	19.3

Source: Elaborated on the basis of AC-Nielsen and Databank data.

CR2: coefficients for the 2 leading firms

CR4: coefficients for the 4 leading firms

**Table 6** - Classification by turnover of the principal enterprises in the milk subsectors in Italy, 2005

	Fresh milk	UHT milk	Yoghurt and desserts	Butter	Fresh cheeses	Soft and semi-soft cheeses
Galbani				2	1	1
Kraft Foods Italia					2	
Lactalis Italia					3	7
Lat Bri					4	
Auricchio						2
Granarolo	1	2	4	3	5	
Parmalat	2	1	5	5		
Danone			1			
Mueller			2			

Source: Elaborated on the basis of AC-Nielsen and Databank data.

plastic bottles or containers with screw-off caps. However, in the case of long-life milk, a product where there is no brand loyalty, marketing policy is based on sales promotion measures and price.

Competition has intensified on the yoghurt market in the past few years; it is observed at various levels: amongst leaders, which invest a great deal in communication and innovation, and followers, which generally duplicate the innovations introduced by the leaders.

The main driving forces behind the growing competitive pressure are the growth in the advertising budget, the need to continue to develop new market niches due to the high degree of demand segmentation, and the reduction of distribution space and thus the increase in referencing costs. This results in the creation of considerable entry barriers, which would be virtually inexistent given the technology employed; the only “physical” obstacle to the entry of new competitors is the need for a distribution network which is equipped with a cold storage chain.

In the fresh cheese segment there has been intensive innovation activity as regards both packaging and the product itself. The multi-pack with monoportions has been introduced, for example, or mozzarella is presented in its brine in a carton similar to the cartons used for cream; and as regards product innovations, many firms have worked on using cheese as an ingredient both by including service directly in ready-prepared fresh products and cook-chill products (from sliced or flaked cheese to breadcrumb products) and by proposing new preparations for home cooking. There is very intensive promotional activity for the main products – mozzarella and crescenza: it is estimated that an average of 37% of these two products was sold at promotional prices in 2005, with peaks of over 50%.

On the dessert cheese market the effect of publicity investments has been strongest in the fresh cheese segment due to the presence of major groups with strong images, which try to limit the pressure on prices and margins through advertising.

The efficiency of distribution plays a fundamental role in firms’ competitive strategies: rationalised logistics and a capillary distribution network are a must in a scenario where commercial margins are steadily shrinking and modern distribution imposes high supply frequency, particularly in the case of limited-life products, which require the cold storage chain.

In the case of hard cheeses, given the very low level of concentration and protection, there is little room for corporate competitive strategies. There are exceptions, however: one is the Biraghi group in the Piedmont region, which used to produce Grana Padano cheese but after adopting very innovatory technologies some 10 years ago, which were not accepted by the controlling consortium, took up the challenge of relinquishing the PDO and pursuing its own course of individual differentiation. Biraghi now collects 450,000 L of milk per day, which are produced by 1,000 dairy farmers in the region, and has some 350 employees. Once the milk has been collected and partially skimmed (butter and fresh cream being extracted), 1,500 wheels of “Granbiraghi” are produced daily plus 700 wheels of Gorgonzola. The main product is similar to Grana Padano, although it is produced by technologies requiring much less time and staff than do the traditional methods. Most of this cheese is either cut into pre-packed portions varying in size – “Biraghinis”, small portions of 25-30 g which are sold in packets of approximately 500 g or 300 g, or processed into grated cheese.



## Collective differentiation for PDOs: the case of Parmigiano Reggiano

The differentiation of Italian hard cheeses – Parmigiano Reggiano, Grana Padano, Pecorino Romano or Pecorino Sardo – is, with very few exceptions, the work of the controlling consortiums. For firms are often too small to have the necessary financial resources and reputation to be able to differentiate their product. Many of them are cooperatives (85% of Parmigiano Reggiano output and 50% of Grana Padano output is produced by cooperatives) and have the problems typical of that form of business, which is often undercapitalised and has complex decision-making mechanisms and entrepreneur-associates who are very averse to risk. Furthermore, production specifications require detailed, rigorous standards, which can become an obstacle to the marketing strategy of individual producers. Parmigiano Reggiano, for instance, has technical characteristics which comply with a well-defined standard. It also has a well-defined image for consumers, who recognize the collective brand but do not associate it with any specific producer.

The collective differentiation system has worked well to date; producers of milk intended for producing Parmigiano Reggiano have always been paid a price which is 20% to 30% higher than the average market price; but they have specific constraints, which are related mainly to cattle feed, and they have higher production costs. Joint action through the financial contributions of dairies meant that relatively large sums of money could be invested in communications, which would otherwise have been beyond the means of individual producers in view of their small size. The controlling consortium is behind this strategy of developing quality collectively. It is a voluntary organisation whose task is to apply the Parmigiano Reggiano production regulations that were laid down by a decree of the Ministry of Agriculture of 17 May 1938. The consortium furthermore promotes the notoriety and reputation of the cheese through advertising campaigns; it looks out for any trademark abuses and assesses the cheese wheels for the awarding of the PDO with the Parmigiano Reggiano trademark branded on the surface or, in the case of pre-packed or grated cheese, printed on the packet.

Over the years the consortiums controlling the principle PDO cheeses – but also other products such as Parma ham, San Daniele ham, etc. – have developed a system of self-regulation of production: the production target is set each year in terms of number of wheels, account thereby being taken of the situation in the production, consumption and export fields. That quantity is then divided amongst all of the dairies on the basis of individual quotas, and the consortium technicians ensure that those quotas are complied with. Following a sudden rise in prices between 1994 and 1995, an enquiry conducted by the Competition and Market Guarantee Authority (the national anti-trust authority) took disciplinary action against this system in 1996 on the grounds of distortion of competition to the detriment of consumers. The system was subsequently dismantled, and this limited the possibility of regulating the sector, which is normally exposed to considerable price fluctuations.

A second limitation was the consequence of the adoption of Community Regulations 2081 and 2082 in 1992, which now constitute the basis governing the PDO system. These regulations make provision *inter alia* for more precise identification of the roles of controlling bodies. Third-party bodies were identified or, in some cases, newly created, as was the case with the Dipartimento Controllo Qualità Parmigiano Reggiano, which carries out controls based on verifying compliance with production specifications, the regulations on cattle feed, the cheese production standards and the rules on label utilisation. All of the actors in the production system are subject to controls: animal farms, dairies, ripening stores and establishments where cheese is cut, pre-packed or grated; inspections are carried out according to an inspection plan, in which the phases of each process are defined and the recommendations made in the production specifications, self-administered controls on the part of the firms concerned, controls carried out by the consortium and the Department, monitoring methods and inspection frequency, and the management of violations of the rules are laid down.

The traditional system of PDO cheese differentiation is today confronted with the phenomenon of growing distribution concentration. Somewhat paradoxically, the long and patient work of producers, who have succeeded in defining a very specific standard for the cheese, is now a weapon in the hands of the major purchasing chains and pools, of which there are five or six. At the present time 60% of Parmigiano Reggiano or Grana Padano is now sold in supermarkets and mainly as a special offer. The producers thus lose all power to negotiate sales conditions. The debate on opportunities for individual differentiation of the product is now on the agenda.

## Consumption and distribution

In 2005, the Italian economy continued to stagnate for the fourth year in succession. The picture is one of a stagnating country with a GDP growth rate of virtually zero from one year to the next (although more recent economic indicators such as industrial production, orders and retail sales suggest that the economy is pulling out of the crisis). The family consumption situation is critical, and this in turn adversely affects corporate activities: whereas a modest increase in private purchases of plus 0.7% in real terms was registered in 2004, the figure for 2005 is -0.1%. This disappointing development of consumption is the combined result of several factors: deterioration in consumer confidence, subdued growth in available incomes and changes in the allocation of funds within family budgets. Corporate distribution strategies have adapted to the circumstances with specific efforts to win consumer confidence by means of aggressive price policies, which have intensified competition amongst distribution channels.

### Drinking milk

This situation is affecting milk products, with differences from one product to another. The drinking milk sector seems to be showing signs of renewed vigour, for instance, as of 2005. After four years of downward trend from 2000 to 2004 and a rate of decrease of

**Table 7 - Retail sales of milk products in Italy, 2005**

	Quantity		Value	
	Tonnes	var. % 05/04	million euros	var. % 05/04
Pasteurised milk	914,410	4.18	1,183,566	4.32
UHT milk	1,410,065	2.83	1,166,690	2.01
Butter	18,728	2.07	109,916	0.22
Yoghurt and desserts	137,478	5.67	485,654	5.53
Fresh cheeses	216,576	3.39	1,442,361	2.93
Mozzarella	149,691	2.78	1,082,198	2.43
Ricotta	53,701	6.64	255,773	7.36
Other	13,184	-2.2	104,390	-1.93
Soft cheeses	57,716	0.26	467,768	-0.16
Gorgonzola	16,012	8.26	137,324	7.02
Crescenza	10,596	-4.65	78,812	-4.08
Italice	4,199	-8.82	36,155	-10.82
Taleggio	3,771	-1.23	30,342	-4.99
Other	23,138	-0.44	185,135	-0.24
Semi-soft cheeses	98,260	-1.57	723,412	-1.67
Emmental and similar cheeses	26,842	-3.77	187,426	-4.37
Provolone	18,157	-3.05	140,113	-2.73
Asiago	12,654	2.85	88,866	2.08
Caciocavallo	8,071	7.74	65,470	9.33
Fontina	7,918	-6.7	56,996	-7.96
Other	24,618	-1.23	184,541	-1.21
Hard cheeses	116,617	1.3	1,142,514	-3.82
Parmigiano Reggiano	36,956	9.04	438,733	-0.83
Grana Padano	49,080	-4.15	424,074	-8.32
Pecorino	15,063	-1.98	147,213	-4.48
Other	15,518	5.86	132,494	2.84
<b>Total cheeses</b>	<b>643,123</b>	<b>1.71</b>	<b>5,002,721</b>	<b>-0.08</b>
<b>Total milk products</b>			<b>7,948,547</b>	<b>1.19</b>

Source: Elaborated on the basis of AC Nielsen data.

-2.6%, a growth rate of over 4% has been registered for pasteurised milk and of 2% for UHT milk; with virtually stable prices for the former and a slight drop in the case of the latter, pasteurised milk is now the leader as regards market share in terms of value (Table 7).

**Chart 4 - Drinking milk distribution in Italy, 2005**



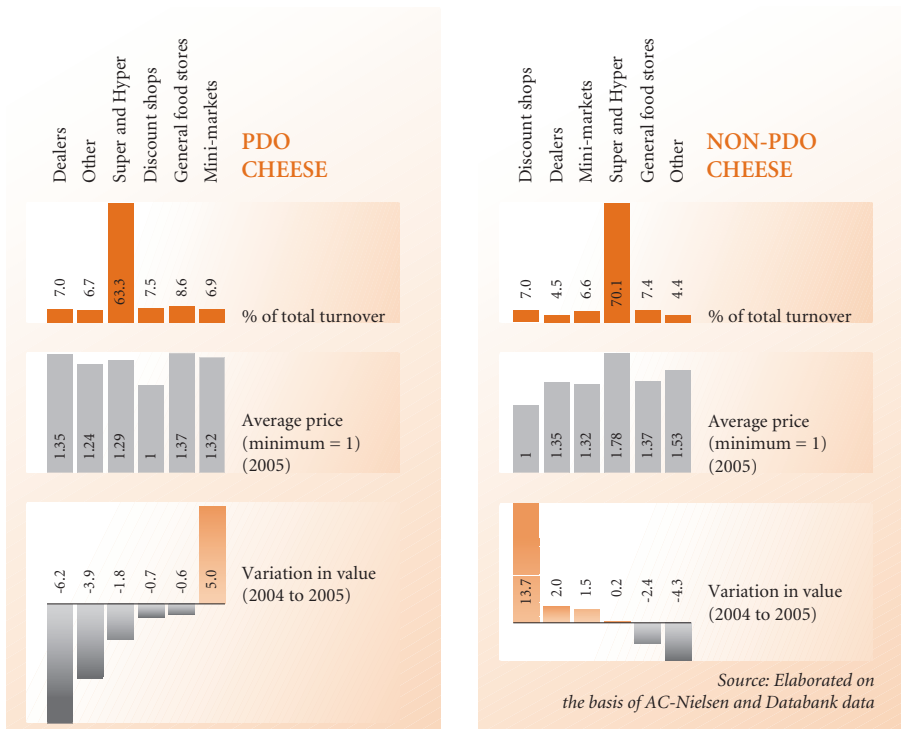
“High-quality” milk is the segment which is growing fastest, accounting for 42% of pasteurised drinking milk compared to 38% three years ago. One of the factors of the success of pasteurised milk is related to the provisions of two ministerial decrees: the first, which dates from June 2003, raised the shelf life of fresh pasteurised milk and high-quality fresh pasteurised milk; and the second, dating from January 2005, requires that the location of the milking and milk conditioning facilities be indicated on the labels of these products. The first decree resulted in a decrease in the average number of purchases, which dropped from 37 to 31 in one year, whereas the second responded to the demand for transparency and security concerning the raw material.

The distribution chains are well aware of the advantage of pasteurised milk as a product which generates an image: the supermarket and hypermarket channels gained considerably in 2005, achieving 67% of market share without using price policies, which do not differentiate them from the traditional retail trade (Chart 4). In the case of UHT milk, on the other hand, where chain stores hold the dominant position, general food stores and mini-markets offer cut-price brands, whereas supermarkets and hypermarkets tend to sell well-known brands.

## Cheese

The cheese market showed tentative signs of recovery in 2005, when sales progressed by 1.7% in terms of quantity. As was the case in previous years, this was possible due to a drop in prices (-1.8%) after several years of steadily rising prices in almost all categories. Expenditure in monetary terms thus remained practically at the same level as the previous year – around 5 billion euros. Stagnating incomes and loss of family purchasing had a negative impact on the consumption of relatively expensive products such as cheese. The scenario was slightly more favourable in the retail field, where retail chains concentrated their efforts on the promotional lever and in particular on price promotion: for the generic category of cheese the share of promotional sales rose from 74% to 79% in the period from 2002 to 2005.

**Chart 5 - Cheese distribution in Italy, 2005**



The best results were achieved in the fresh cheese segment, which progressed by 3.4% in quantity and 2.9% in value in one year. Mozzarella is the bestseller in the category, since it lends itself to a wide variety of formats and presentations.

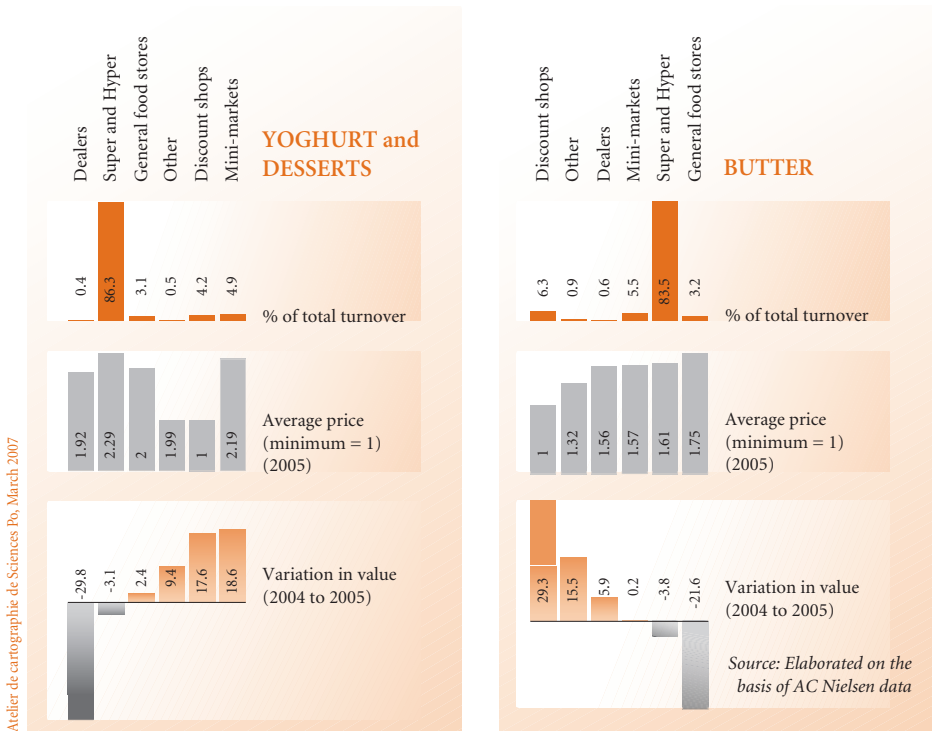
Hard cheeses, the other major segment of national production, progressed by 1.3% in quantity but dropped in value due to a sharp fall of 5% in the average price.

When one makes a distinction between PDO and non-PDO cheeses, the worst performance was registered for PDO cheeses, where there was a decrease in turnover, particularly in the case of cheese-mongers, who deal mainly in top-of-the-range products (Chart 5). Non-PDO cheeses progressed, on the other hand, mainly in discount shops, which achieved a market share of 7% through a considerable price advantage.

## Other milk products

Butter does not feature in the dietary tradition of the majority of Italians: although its market penetration is estimated at 82% (more than 4 out of 5 families buy butter at least once a year), per capita consumption is under 3 kg, since it is confined to the role of cooking ingredient (Chart 6).

**Chart 6 - Yoghurt + desserts and butter distribution in Italy, 2005**



The upward trend registered in the yoghurt sector in 2003 was confirmed in 2005. This is a development which distinguishes Italy from the other European countries, where the market profile is one of maturity on the whole. With a per capita consumption rate of 7 kg/year, Italy is a major consumer (ranking 15th on the world scale), although it still lags far behind the Netherlands (almost 25 kg/capita), Finland or France (23 kg and 21 kg respectively).

# RESTRUCTURING OF THE SPANISH MILK INDUSTRY

quality and corporate strategies

*Samir Mili*

## Milk production structures and policy

The share of the milk sector in agricultural production in Spain is one of the lowest in the European Union (EU): 5.8% of the value of final agricultural output in 2004 (13.3% in the EU-25); Spanish cow's milk output accounts for just under 5% of the total community volume (Table 1), behind Germany (21%), France (18%), the United Kingdom (11%), the Netherlands (7%) and Italy (7%). The milk production structures are still extremely fragmented with some 29,000 farms, most of which are family farms. Since Spain joined the EC in 1986 total milk output in the country has virtually stabilised over the long-term due to the manifestly inadequate milk quota.

## Milk production structures

Total milk output in Spain is currently 7.5 million tonnes, 88% of which is cow's milk, 6.6% goat's milk and 5.6% ewe's milk. As is the case in other EU countries, the size of dairy herds is decreasing and output is increasing (Sineiro and Valdés, 2001; Buxadé, 2004). There are currently approximately one million dairy cows in Spain (1.057 million in December 2004, 4.5% of the total number in the EU-25). As for milk output, the figures are still amongst the lowest in the EU, despite the increases that have been achieved: an average of 5,681 kg per cow in 2004 as against 5,897 kg for the EU-25 and 6,233 kg for the EU-15.

In 2005, there were 3 million dairy sheep producing 422,000 tonnes of milk (i.e. a yield equivalent to 135L per ewe per year), and 1.4 million dairy goats with an output of 498,000 tonnes of milk (i.e. an average of 315 L per goat per year). Increasing yields have also been registered for these two commodities over time. Practically 10% of the ewe's milk is used for making hand-crafted cheeses, and the remainder is supplied to industry. A small proportion (1%) of the goat's milk is consumed as drinking milk, 9% is used for the on-farm production of hand-crafted cheeses, and 90% is sold to industry for cheese-making (Mercasa, 2006).

**Table 1** - Milk and milk product output in the world, in the EU and in Spain (1000 T)

Commodity	Year	World	UE**	Spain
Cow's milk	2002	507,994	121,957	6,418
	2005*	529,833	142,524	6,636
Ewe's milk	2002	8,047	2,309	406
	2005*	8,574	2,362	422
Goat's milk	2002	12,121	1,616	513
	2005*	12,438	1,806	498
Cheeses (all types)	2002	17,284	7,111	203
	2005*	18,483	8,714	134
Butter	2002	7,950	1,789	56
	2005*	8,206	2,060	51
Evaporated and condensed milk	2002	3,986	1,316	74
	2005*	4,014	1,449	65
Powdered skimmed milk	2002	3,504	1,078	14
	2005*	3,280	1,242	13
Powdered whole milk	2002	2,659	721	15
	2005*	2,755	825	14

Sources: FAO, Eurostat, MAPA, (Ministry of Agriculture, Fisheries and Food) 2006.

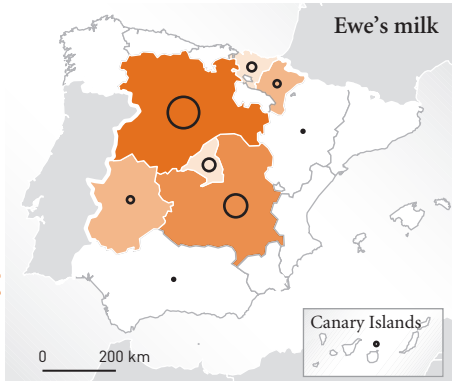
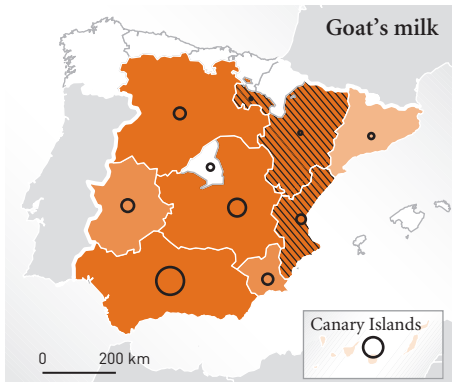
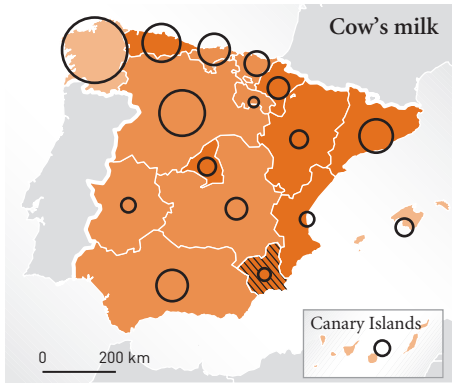
\* Estimation - \*\* EU-25 for 2005

At the regional level, cow's milk production is concentrated in Galicia (34.5% of total of national output in 2003), which is followed by the region of Castilla and Leon (14.6%), Asturias (10.2%), Catalonia (8.7%), and finally Andalusia and the Cantabria region with 8.2% each. These six communities together account for almost 85% of Spain's total output (Map 1). Ewe's milk production is concentrated mainly in the two Autonomous Communities of Castilla and Leon and Castilla-La Mancha, whereas goat's milk is produced mainly in Andalusia, Castilla and Leon, Castilla-La Mancha and Extremadura.

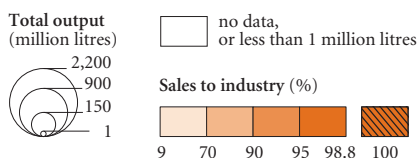
The average size of Spanish farms (measured in milk quota) is currently 200 tonnes of milk; this is close to the French average (210 tonnes) and above the EU-25 average (Escribano, 2006); 36% of the total number of dairy farms in 2005-06 were small farms (less than 75 tonnes), and 13% of these small farms produce less than 25 tonnes as against 89% in 1992-93 (Table 2). Most of these farms are in Galicia (which accounted for 55% of milk producers, 36% of dairy herds and 35% of national output in 2006). Production methods have changed little: a limited number of cows, elderly farmers effecting few investments. However, these farms play an important role in maintaining the rural fabric.



**Map 1** - Spanish milk output: regional distribution, 2003



Atelier de cartographie de Sciences Po, March 2007



Source : MAPA (2006b)

Average-sized farms (between 75 and 300 tonnes) have acquired greater technical expertise in their production methods, and the number of such farms throughout the country has increased (46% in 2005-06 compared to 10% in 1992-93). At the same time the average age of farmers has dropped while the level of training and professionalism has improved and the legal status of many farms has changed: individual farms have given way to small companies (mainly through mergers) or to farms that are organised on a cooperative basis and can cover all of the phases of the production process; this latter type of farm currently accounts for over 35% of the national milk quota.

Similarly, the number of large farms (over 300 tonnes) has continued to increase: 18% in 2005-06 as against 1% in 1992-93. They have a high level of technical expertise and effect major investments. There are at present almost 5,400 such farms, which manage 58% of the national milk quota. In addition to these various farms there are 158 farms with a quota higher than 2,000 tonnes absorbing a total of 572,000 tonnes of quota.

Table 3 gives the structural indicators and average financial results of a cattle dairy farm in 2000 and 2003; one notes that the net value added per farm is 22,000 as against total costs amounting to 30,000, 40% of which concern cattle feed.

## Milk payment

Milk production in Spain, as in other countries, is seasonal to some extent, with peaks in April and May and lowest output during the winter months (particularly December and January). These variations

**Table 2 - Stratification of farms with quotas, April 2006**

Quota tranche	Number of farms	%	Total quota (1,000 T)
< 25	3,700	13	51
25-50	3,550	12	132
50-75	3,100	311	192
75-200	9,950	34	1,290
200-300	3,590	12	870
> 300	5,360	18	3,550
<b>Total</b>	<b>29,250</b>	<b>100</b>	<b>6,085</b>

Source: FEAGA, La Tierra, 196, 2006.

in output have direct consequences for the evolution of milk prices and processed milk products (Chart 1 and Table 4): prices drop in high output periods due to the fact that milk markets are extremely sensitive to fluctuations in supply. Other factors such as levels of domestic demand and consumer prices and levels of external milk demand and milk prices, particularly in France and Portugal, also condition the determination of milk prices in Spain.

It must be pointed out that the farm gate price for milk in Spain has increased in the past few years and is now over 0,30 euro/L (2006 data from the Spanish Federation of Dairy Industries (FENIL)). At the same time milk prices in other countries such as Germany and France are dropping (only 0,27 euros/L). Yet the price of milk in Spain used to be lower than the EU-15 average (Álvarez del Campo, 2006).

The producer price for milk (Chart 1) is fixed in private negotiations between the producer/farmer and the purchaser, (practically) without any public references or guide prices. Initiatives to establish a reference price for transactions between farmers and purchasers have been unsuccessful in Spain due mainly to the opposition of the Spanish Competition Tribunal, which considers that these practices restrict competition on markets and prejudice consumer rights.

Furthermore, as a highly perishable product milk needs to be collected on the farm within two days and this weakens the farmer's position in any negotiation. This is aggravated by the fact that competition amongst purchasers (horizontal competition) is limited: since there is often only one purchaser in a production area, farmers have no other alternatives for selling their milk. What is more, a very large volume of deliveries is concentrated on a very limited number of purchasers, which means that the latter can control the market in a virtually oligopolistic setup. And finally, the volume and quality of the milk produced plus more or less difficult farm access are further factors which influence a farmer's position in any negotiation.

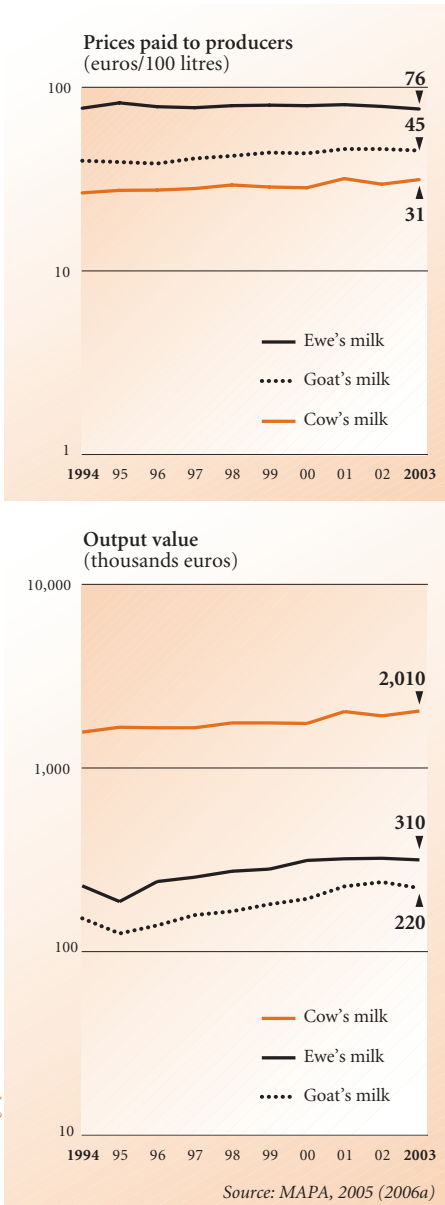
**Table 3** - Structural indicators and economic-financial results of the cattle dairy farms covered in the National Agrarian Accounting Network (RECAN), 2000-2003

Indicator	2000	2003
Farms represented	54,812	36,460
Farms in the sample	1 478	1,182
Total agricultural area in use (AAU) (ha)	11.3	14.3
Units of cattle (UC)	24.9	27.7
Labour (ALU)		
Total	1.2	1.3
Family	1.2	1.3
Gross output (euros)		
Total	40,101	46,580
Animal	34,349	40,141
Farm subsidies (euros)	1,166	2,108
Costs (euros)		
Total	26,608	30,330
Compound feed purchased	10,692	12,348
Investments in capital	2,482	2,637
Depreciation	2,398	2,142
Energy	1,148	1,348
Final agrarian production (euros)	35,022	41,162
Gross value added (GVA) at market price (euros)	19,107	22,133
GVA at factor cost (euros)	20,273	24,398
Net value added (NVA) at factor cost (euros)	17,875	22,256
Available farm capital (euros)	16,931	21,152
Gross animal output (euros)/CU (euros/CU)	1,382	1,449
NVA/YWU (euros/YWU)	14,894	17,120
Available farm capital/Gross output (%)	42.0	45.0

Source: RECAN 2000, 2003. MAPA 2001 (2006)

Note: one CU is the equivalent of one dairy cow.

**Chart 1 - Prices paid to producers (PP) and output value (OV), 1994-2003**



Atelier de cartographie de Sciences Po, March 2007

## Foreign trade

The volume of Spanish external trade in milk and milk products (imports plus exports) has increased significantly since EC accession, imports growing at a higher rate than exports.

Chart 2 shows that the import-export ratio in this sector was just under 50% in the period from 2000 to 2005. This situation of structural deficit in the Spanish milk sector is illustrated in the figures for the annual trade balance of milk products (Table 5, data on the last consolidated balance sheet for 2003). Since the quota of 6.1 million tonnes of milk is far from sufficing to cover domestic demand – estimated by certain sources at around 9 million tonnes of milk equivalent –, Spain imports large quantities from the EU, mainly from France, where prices are lower and there are surpluses that are difficult to market outside the EU without adequate Community export subsidies (Calcedo, 2006).

Spain is a net importer of drinking milk and fresh products (yoghurts etc.), powdered milk and, in particular, cheese (Table 5). The major part of Spain's foreign trade in milk products is carried out with EU countries (98% of imports and 90% of exports). Cheese imports have increased by 600% since Spain joined the EC, while the flows of milk and non-concentrated cream have been consolidated over the past few years.

The main Spanish products exported are milk and non-concentrated cream (to France and Portugal), powdered milk (to France

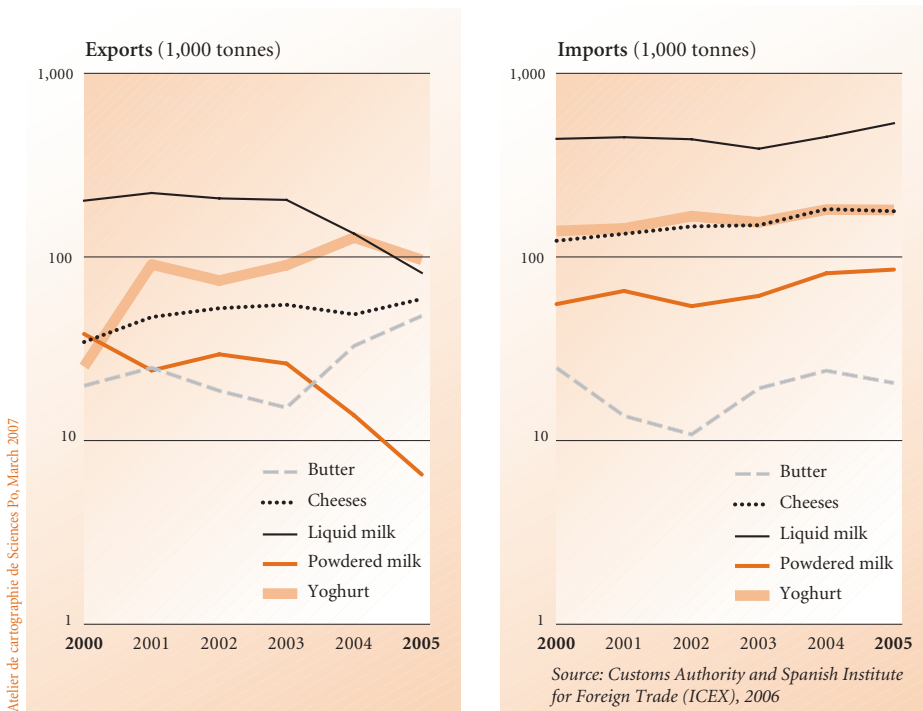
and Portugal), serum, yoghurt and other products (to Portugal), cheese and curdled milk (to Italy, Portugal and France). The flows of raw milk to and from France and Portugal should be regarded as the logical development of trade between regions with surpluses and deficits within the framework of a highly integrated economic area such as the EU.

**Table 4 - Market prices of milk products (euros/100 kg)**

Commodity	2003	2004	2005
Powdered skimmed milk	196.0	210.7	219.5
Condensed milk	220.1	220.0	219.9
Butter	295.1	282.8	224.7
Emmental cheese	684.6	698.4	771.6
Manchego cheese	1,018.8	1,039.8	1,016.8
Cheese balls	573.7	584.3	615.5

Source: MAPA (2006b).

Outside the EU, Spanish imports come from a variety of origins, mainly Australia, New Zealand, Eastern European countries and Switzerland. Export destinations are just as varied: Andorra, Gibraltar, North African countries, Asian countries and the Caribbean.

**Chart 2 - Foreign trade in milk and milk products, 2000-2005**

## Milk market regulation and CAP reform

The Common Market Organisation (CMO) for milk and milk products<sup>1</sup> is governed by the Common Agricultural Policy (CAP) with a view to limiting production on the

1 - Council Regulation (EC) 1255/1999 of 17 May establishing the CMO for the milk and milk products sector.

**Table 5 - Trade balance of milk products in Spain, 2003 (1000 T)**

Item	Drinking milk, Yoghurt, curds	Concentrated milk	Powdered whole milk	Powdered skimmed milk	Fresh products except cream	Cream	Butter	cheese	Processed cheese
Usable output	4,237.3	52.9	13.1	19,5	5,226,0	70.1	54.5	315.4	22.9
Imports	215.7	9.5	3.6	8.1	489.4	16.6	8.3	130.1	15.5
from the EU	215.7	7.3	3.6	7.8	488.8	16.6	8.1	126.0	15.2
Exports	92.0	15.1	6.9	0.2	224.5	3.7	3.3	47.8	5.1
to the EU	78.8	5.9	1.2	0.2	203.9	3.5	3.0	43.8	4.1
Variation in stocks	-	-	-	-2.8	-	-	18.1	-	-
Total domestic use	4,360.9	47.2	9.7	30.3	5,490.8	83.0	41.4	397.7	33.3
Human consumption	4,360.9	47.2	9.7	30.3	5,490.8	83.0	41.4	397.8	33.3

Source: MAPA (2006b).

one hand by means of the quota system and protecting the community market on the other hand by means of a system of institutional prices (target price for milk, intervention price for butter and powdered milk.<sup>2</sup> The CMO for milk also establishes aids for the private storage of several milk products (butter, cream, powdered skimmed milk and certain types of cheese) as well as measures to support the marketing of certain milk products in order to promote consumption of the latter in non-profit institutions and their use in the production of confectionery and bakery products and ice cream. There are also aids for skimmed milk for animal feed.

Trade with third countries is controlled by a system of regulating import levies<sup>3</sup> and export subsidies. The latter account for a substantial share of total CAP expenditure in the sector, and their volume has increased significantly in Spain in the past few years. In 2004, the subsidies amounted to 32.4% of total community export aids paid through the Spanish Agricultural Guarantee Fund (FEGA).

These mechanisms have resulted in a very protected market on the whole, with artificially high prices, very little competition from third countries and exports which depend to a large extent on subsidies, which in turn are related to the levels of butter and powdered milk stocks. These measures have also considerably conditioned the functioning, development and strategies of the milk industry, which in many cases is the link used

2 - The intervention prices for the 2004-2005 farm year (from 1 July 2004 to 30 June 2005) were € 305.23 for 100 kg butter and 195.24 for 100 kg of powdered skimmed milk.

3 - This system prevents products from entering the market in practice, with the exception of those included in the tariff quotas established in the context of the World Trade Organisation (WTO) agreements or other commercial agreements in effect.

for their implementation. On the one hand, the establishment of the quota system has affected the volume of national milk supply and its geographical distribution, and on the other hand it has changed the milk industry's materials management mechanisms. The main milk purchasers are thus the operators responsible for controlling deliveries and, as the case may be, penalising producers with an additional tax. In order to facilitate this task many non-cooperative dairies have externalised their milk purchasers by promoting legally authorised firms which attend to this activity. Similarly, since the quotas have been applied the Spanish raw milk market has been disrupted by production surpluses (over-quota volumes which have been reduced in the past few years through various controls and currently amount to 10% of the quota allocated). This surplus production is due to the fact that when the quotas were allocated in Spain Spanish farmers were experimenting with the restructuring process (resulting in larger farms) with a view to achieving profitability and size thresholds which would enable them to compete on the European scene. The leeway resulting from cessations, public quota allocations and quota trading has proved to be inadequate for that purpose.

Furthermore, although the CMO for milk in Spain was applied simultaneously with Spanish accession to the EC in 1986, the milk quota has been applied since 1993/94, at which time the Spanish quota covered 75% of the output anticipated. As the result of the subsequent CMO reform in 1999 the reference quantity allocated to Spain was increased by 550,000 tonnes. The price of milk, which had been extremely low until the 1993/94 farm year, rose on the other hand and the market became relatively stable. However, the application of the quota system and the inflexibility of the market to which it gave rise caused a number of problems in view of the growing output of farms and their need to expand and also the number of young farmers wanting to set up business.

From the point of view of sectoral organisation, the application of the milk quotas in Spain meant that the significance of businesses specialising in milk collection increased to the detriment of direct collection by dairies. Dairies had previously had several avenues of supply at their disposal: direct collection from a network of producers, purchase from milk supply cooperatives or producer groups, and purchase in bulk from other businesses which could be simple wholesalers or industries selling surpluses. In this context, the application of the quotas promoted the development of sales cooperatives and firms specialising in collection and sale to industries in bulk. In other words, it stimulated horizontal integration and market concentration.

More recently, the reform of the CMO for milk and milk products (CAP reform of June 2003, Luxembourg Agreement) introduced important changes, which affect the entire sector. These changes included the abolition of the target price for milk as of 1 April 2004, the reduction of the intervention price for butter by 25% in four stages from 2004 to 2007, the reduction of the intervention price for powdered skimmed milk by 15% in three stages from 2004 to 2006, the establishment of a maximum quantity for a limited period for the purchase of butter at the intervention price and the (100%) decoupling of production aids as of 2006 through measures to convert the existing aids into a single payment per

farm conditional in compliance with a series of directives concerning animal health and welfare, environmental protection and compliance with good agricultural practices.

At the same time, the progressive reduction of export subsidies with a view to more extensive liberalisation of international markets would reduce the competitiveness of the European and Spanish milk industry, where production costs are estimated at 0.29 per litre of milk compared to 0.15 per litre in the case of major producers and net exporters such as Australia and New Zealand (Galindo, 2004).

The quotas have been extended until the 2014-15 farm year and they are increasing by 1.5% for the member countries which did not benefit from a special increase in 1999; this does not concern Spain, whose quota was already increased in the Agenda 2000 context. Paradoxically, these increases could contribute to an increase in the milk surpluses that already exist in the EU and thus cause prices to drop in the member states with surplus production (reduction compensated almost in full by direct aids and additional payments to producers according to their quotas), which will probably seek new export markets such as the Spanish market.

All in all, as is the case in the other European countries, the Spanish milk sector is now in a complex situation as the result of this reform, with uncertainties which make it necessary for the parties involved – i.e. producers, industrialists and the public authorities – to cooperate to a greater extent (Díaz Yubero, 2006). It was in this context that the Spanish Ministry of Agriculture, Fisheries and Food (MAPA) devised a plan for restructuring the Spanish milk sector (Royal Decree 620/2005 of 27 May), which was implemented in 2005. This plan is based mainly on a programme for the relinquishment of quotas and repurchase of the quotas by the National Fund, whereby prices and allocation criteria are laid down by the Ministry itself (MAPA, 2006a) and the possibility for private individuals to transfer quotas without land is eliminated.

As a result, 2,038 farmers have given up farming, involving a total quota of 269,536 tonnes, half of which has been compensated at the basic rate of 0.50/kg, and the other half at higher rates depending on the applicant's age; 80% of these farms had a quota lower than the national average. Furthermore, this restructuring plan pursues other objectives such as improving dairy farm structures, enhancing farmers' professionalism, and improving farm competitiveness and sustainability, improving retirement conditions for producers who have joined the cessation programme, increasing the quota volume of small farms, promoting proportional quota-sharing amongst the autonomous communities, and encouraging young people to go into farming in order to facilitate inter-generational transfer.



## Consumption and distribution of milk and milk products

### Evolution of consumption

The structure of milk consumption in Spain is substantially different from that in the other EU countries. Per capita liquid milk consumption is higher than the Community average. Yoghurt and milk dessert consumption is also higher, but cheese and butter consumption, on the other hand, is much lower than the European average.

The main consumption trends in the last few years have been a drop in liquid milk consumption, relative stabilisation of the consumption of classical yoghurts, and an increase in the consumption of cheese and milk derivatives. According to the statistics of the MAPA Food Consumption Panel, per capita liquid milk consumption in Spain amounted to around 105.2L in 2004, which was 11.4% less than in 1995 (Chart 3). In the same year, the average per capita consumption figures for yoghurt, cheese and milk derivatives was 11.6 kg (11.5 in 1995), 7.3 kg (an increase of 15% compared to 1995) and 39 kg (46% more than in 1995) respectively.

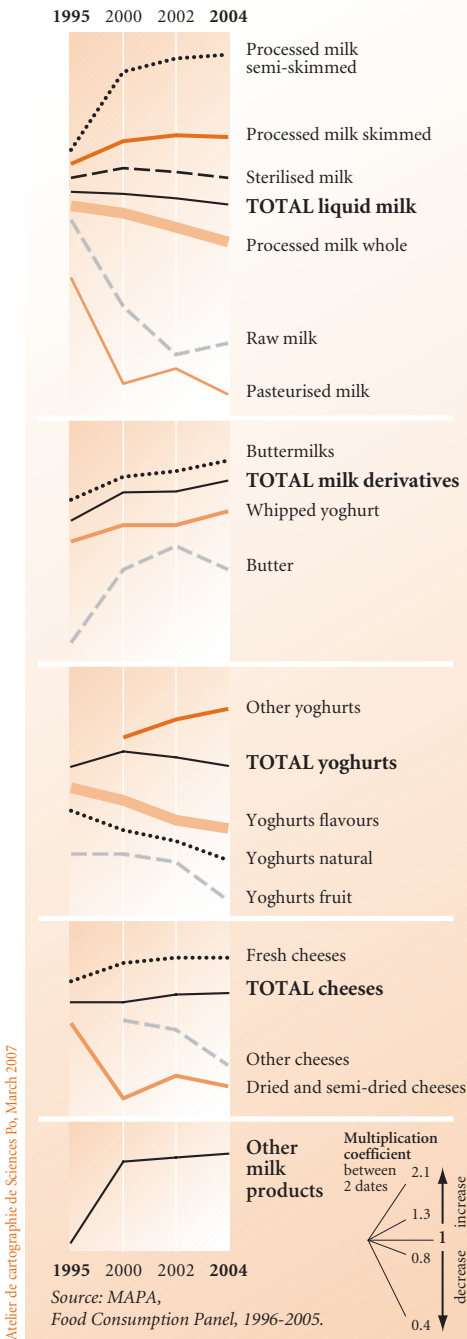
Consumption patterns have differed from one milk category to another; raw milk in bulk has practically disappeared from final consumption, for instance (2.7% of total per capita consumption of liquid milk in 2004 compared to 7.8% in 1995 and 38% in 1987), and the consumption of sterilised milk has increased: 93.7% of individual consumption in 2004 as against 83% in 1995 and 75% in 1987. Despite promotion campaigns, pasteurised milk consumption has steadily decreased (3.4% in 2004 compared to 9% in 1995).

By 2004, the share of semi-skimmed milk in consumption had grown considerably (31.1% compared to 11.7% in 1995), as was also the case with skimmed milk (21% as against 15.3% in 1995). Whole milk consumption dropped on the other hand (47.9% compared to 63% in 1995). As regards consumer prices, according to the figures of the MAPA Food Consumption Panel, liquid milk prices remained relatively stable in the period from 1995 to 2000 and then began to rise mainly in connection with the change in the composition of the liquid milks marketed.

The price management bodies that existed before Spain joined the EC exerted strong downward pressure on price levels, particularly in the case of pasteurised milk, and this was a contributing factor in the orientation of part of the milk industry's activity towards sterilised milk. After Spain's accession to the EC growing pressure was exerted by the large-scale retail trade, which itself was becoming increasingly concentrated.

A further factor that has been observed is the differentiation of milk and milk product consumption, the main strategy being the recent increase in new products with a high

**Chart 3 - Consumption of milk and milk products (MMP) in Spain, 1995-2004**



value added such as enriched or functional milk products (products containing certain active components with beneficial effects on body functions in addition to their nutritional value). The driving force behind the development of these products is the emergence of new life styles as the result of socio-cultural change combined with growing consumer expectations regarding the nutritional quality, safety and functionality of food products (Mili, 2005). According to data published by IRI (Information Resources Inc.) Spain, the volume of basic-range milk marketed has dropped steadily over the past few years, whereas the various categories of enriched milk have been increasing in volume (Table 6).<sup>4</sup>

This evolution of consumption on the liquid milk market (classical milks *versus* new milks) is also observed in the yoghurt segment. The national yoghurt market has developed in the last few years, for instance, as the result of a number of factors such as health as a purchase variable, moderation in the growth of average prices and an increase in the participation of retail brands. However, while conventional categories (flavoured, skimmed, natural, enriched, with fruit added, etc.) are stagnating in terms of sales and billing volume, functional yoghurts such as “bifidus” yoghurt and other fermented milks (OFM) are the mainspring of growth (Table 7). According to the figures published by IRI Spain, this category accounted for 43.7% of the total yoghurt market in value and 31.2% in volume in 2005. Its market share increased by 18.5% in 2005 compared to the previous year, an unusual percentage on the food market of a developed country. This development clearly shows the

**Table 6** - Evolution of the Spanish milk market by segment

Segment	% Volume		% Value	
	2004	2005	2004	2005
Long-life milk	98.8	98.8	98.6	98.7
Basic	79.0	77.0	72.6	70.0
Enriched	19.8	21.9	26.1	28.6
Calcium	14.4	14.7	18.2	18.2
Heart	3.7	4.7	5.5	7.0
Energy and growth	0.8	1.2	0.9	1.3
Fibre	0.3	0.3	0.4	0.4
Digestive	0.2	0.2	0.2	0.3
Soy	0.0	0.1	0.0	0.2
Other	0.5	0.7	0.9	1.3
Short life	1.2	1.2	1.4	1.4

Source: IRI Spain, 2005.

**Table 7** - The Spanish yoghurt market by segment

Segment	2004		2005	
	% Volume	% Value	% Volume	% Value
OFM (*)	11.0	20.1	13.0	23.6
Bifidus	17.9	19.9	18.2	20.1
Skimmed	17.8	17.5	17.9	16.9
Flavoured	15.6	9.4	14.9	8.9
Natural	15.2	9.0	14.2	8.2
Liquid	6.6	5.3	7.1	5.4
Creamy	3.7	5.0	3.6	4.7
Ethnic	2.7	3.1	2.9	3.2
Fruit	4.9	3.1	4.4	2.8
Enriched	2.1	2.9	1.8	2.6
Remainder	2.4	4.7	2.0	3.6
<b>Total market</b>	<b>626,448 t</b>	<b>1,483.2 millions €</b>	<b>667,156 t</b>	<b>1,608.3 millions €</b>

Sources: IRI Spain, 2006; Alimarket Revista, 194, 2006.

(\*) Other Fermented Milks: comprises mainly functional milks fermented by *L. Casei* (90% of the volume and 86% of the value of this category as a whole in 2005) and milks with an anti-cholesterol factor (9% of the volume of 12% of the value of the category in 2005).

4 - Spain is now the leading country in Europe as regards the share of enriched milks in the total volume of drinking milk (23%).

importance of health in food product demand; more specifically, probiotics<sup>5</sup> and bifidus are two of the most innovative products.

The OFM market is currently dominated by functional milks fermented by *L. Casei*, whose main contribution is to stimulate the body's natural defences by strengthening the immune system on the basis of its preventive and/or corrective action. Yoghurts fermented by *L. Casei* account for 85.8% of the OFM market (12.5% in the case of functional fermented milks with an anti-cholesterol factor and 1.67% in the case of functional fermented milks which help to regulate blood pressure). Bifidus yoghurts have been on the shelves of the Spanish retail trade for 20 years and are in the range of yoghurts with the highest sales volume.

It should be pointed out that in consumption analysis the substitution relationships between milk products and other foodstuffs and beverages are particularly marked due to the dynamics of the cross-elasticities of demand. Cakes, fruits and juices are substitutes for milk desserts; margarine and yellow fats in general are substitutes for butter, etc.

## Distribution

The large-scale retail trade accounts for the major part of the milk and milk product market, and its share is growing with time. In concrete terms, 91.2% of the total volume of liquid milk, at 93.6% of sterilised milk and 93% of the yoghurts consumed in Spain were marketed through the large-scale retail trade in 2004 (Table 8). This retail trade also accounts for most of the sales of cheese (74% in 2004), which was previously a specialty of traditional cheesemongers. Its milk product strategy differs substantially from one segment and category to another. The vast majority of chilled liquid milk and milk derivatives, butter, creams, etc. are supplied through purchasing pools, and this limits the number of brands and suppliers. The major retail chains have developed their own brands of milk and yoghurt with growing market presence.

The new products generally are not covered by retail brands and supplies are obtained from industrialists directly. Liquid milk is frequently used as a loss leader resulting in substantial price reductions, which have caused tension and conflict in the sector. In 2005, the liquid milk segment of retail brands accounted for 36.8% of the volume and 29.5% of the value of total liquid milk sales.

In the cheese segment the strategy pursued by the large-scale retail trade differs from one product to another. In the case of the more homogenised products (cheese bars, grated cheeses, fresh cheeses, etc.), the strategy is similar to that pursued in the classical milk and yoghurt category; in the case of quality cheeses, the strategy is similar to that pursued in the quality wine or olive oil segments (special counters or areas

---

<sup>5</sup> - Probiotics are those which contain an adequate number of viable micro organisms which act on the digestive tract with beneficial effects for the health such as strengthening the immune system or helping to reduce cholesterol levels. Prebiotics, on the other hand, contain molecules which promote the absorption of nutrients and the survival or the activity of beneficial micro-organisms such as probiotics.

reserved for these products, a variety of products and origins, etc.). In this case the distributors work with various suppliers. In addition, retail brands account for 30% of market share in the milk derivatives and fresh cheese segments.

**Table 8 - Commercial distribution of milk and milk products by form of commercial structure (household purchases)**

Product/form of commercial structure (%)	Liquid milk			Sterilised milk		
	2000	2002	2004	2000	2002	2004
Traditional retailers	6.3	5.0	3.6	4.8	3.7	3.1
Supermarkets	59.9	64.5	65.0	62.2	65.9	66.7
Hypermarkets	28.5	26.8	26.2	29.8	27.6	26.9
Other forms of commercial structure (*)	5.3	4.3	5.2	3.2	2.8	3.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Product/form of commercial structure (%)	Milk derivatives			Yoghurts		
	2000	2002	2004	2000	2002	2004
Traditional retailers	10.9	9.6	8.8	4.0	2.7	2.1
Supermarkets	58.3	61,5	64.2	70.0	74.4	74.3
Hypermarkets	25.8	23,7	22.8	23.0	21.7	22.5
Other forms of commercial structure (*)	5.0	5,2	4.2	3.0	1.2	1.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Product/form of commercial structure (%)	Cheeses		
	2000	2002	2004
Traditional retailers	17.3	15.9	16.0
Supermarkets	50.5	53.3	55.8
Hypermarkets	25.3	23.4	21.9
Other forms of commercial structure (*)	6.9	7.4	6.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Source: MAPA, 2001-2005.

(\*) Including company stores, street markets, door-to-door sales, own consumption and other minor distribution channels

## Quality and traceability in the Spanish milk system

One of the main objectives of the operators in the sector is to improve the quality of milk and milk products as well as all of the processes employed in the production and marketing chain. Quality in the broader sense is conceived as the effective control of all risks associated with the production, processing and distribution of milk and its derivatives so that consumers can be supplied with healthy and safe products which meet their growing expectations regarding the quality of the products they consume. We would point out that consumer interest in the safety of food from the health point of

view has grown as the result of the food crises of the past few years, and this has contributed to the establishment of a new legal framework in the field.

## Health aspects

From the health point of view, the regulations require the milk industries to introduce food safety programmes and protocols based on the principles of analysing dangers and critical control points (HACCP). Since it is particularly difficult to apply these principles on dairy farms (Escribano, 2006), EC Regulation 852/2004, which entered into effect on 1 January 2006, proposes that guides to good practices be drawn up, which producers would use on a voluntary basis, with a view to promoting appropriate hygiene practices at farm level. These practices must contain the necessary information on the hazards that can be involved in production and on the necessary measures for avoiding them.

Royal Decree 1679/1994 of 22 July lays down the health conditions applicable to the production and marketing of raw milk, milk that has undergone heat treatment, and milk products. An activity protocol has been drawn up for monitoring and assessing health conditions in milk production with a view to ensuring uniform application of the decree throughout the country. It comprises animal and farm inspections, the taking of samples for laboratory analysis in order to monitor the germ and somatic cell content of raw milk, testing to check for the presence of added water in raw milk, and testing for the presence of residues in raw milk. Checks will also be carried out to ensure that the milk does not contain any pharmacologically active substances in quantities higher than the specified limits.

## Traceability in the milk sector

At EU level, Regulation (EC) 178/2002 of the European Parliament and of the Council of 28 January 2002 lays down the general principles and requirements of food law, establishes the European Food Safety Authority and lays down procedures in matters of food safety. It defines traceability as the ability to trace and follow a food and its ingredients or a live animal through all stages of production, processing and distribution. Economic operators are thus required to guarantee that they can identify the immediate supplier of the product concerned (live animal, foodstuff) as well as the immediate receiver.

Various guides and documents have been drawn up to help producers fulfil the new requirements laid down in the regulation and to promote greater efficiency in the establishment of traceability systems. The Spanish Food Safety Agency (AESAs) has drawn up a "Guide for Applying the Traceability System in Agro-Food Businesses" (AESAs, 2004) in collaboration with professional associations and other public bodies with either direct or indirect authority over traceability systems (MAPA, Ministry of Consumer Affairs, Autonomous Communities).

Since January 2005, all food businesses must have the necessary instruments for providing product traceability from production to final consumption. The MAPA approved new regulations in 2004 (Royal Decree 217/2004 of 6 July) for that purpose ensuring the quality and traceability of milk and milk products. In that instrument the possibility is considered of introducing a traceability system for raw milk based on the identification and registration of all operators and establishments involved in the collection, transport, storage and treatment of cow's milk and of their milk containers (registered cooling tanks, milk tankers, silo tanks), through which the movements of raw milk between the various operators in the supply chain can be registered.

The central element in this traceability system is a single computerised database known as "Letter Q", through which the register of operators and the transmission of data on the movements is managed. The operators in the industry have been communicating their raw milk movements since 1 January 2005. In a subsequent phase information on the quality of the milk in all of the stages of its production will be entered into this "Letter Q" system in order to enhance product safety and the transparency of the sector as a whole.

Some firms have anticipated this move and have set up their own additional quality and safety system. The Danone group, for example – the market leader in the manufacturing of yoghurt and milk deserts – has been running a cattle management programme since 2004 known as Ganet, through which, according to the group, milk suppliers' costs can be optimised, cow health can be improved and the quality of the milk collected can be enhanced. The Ganet programme enables producers to enter their data anonymously and to ascertain the best practices for optimising farm management and obtaining better unit yields.

The Leche Pascual Group has created a similar food safety programme based on the instructions of the EU White Paper on Food Safety and the various Spanish laws in force at both the national and regional level. This programme provides for any possible risk deriving from the activities involved in milk production concerning hygiene in the plant, cattle feed, animal welfare, the quality of the water used, environmental protection, etc. One new factor introduced by the programme is the conducting of a periodical risk audit, through which a milk quality certificate can be obtained at the end of the process.

In addition, safety and quality in this sector have improved with technological advancements in preservation and packaging. The introduction of polyethylene terephthalate (PET) in the milk sector, for example, offers several advantages: uperised milk can be packed in sterilised packages which guarantee that all of the properties of the milk will be preserved. This technology, which has been used for some time in water packaging, has only been available in the milk sector very recently.

The Leche Pascual Group has also developed a new integral production management system, which is based on MES (Manufacturing Execution Systems) standards and

involves product traceability control and an added food safety guarantee. It is a management and control system through which data can be obtained in real time through the monitoring and supervision of every production process. With this system it is possible not only to obtain information on manufacturing factors such as raw materials, machinery, cleaning, persons, cycles, dates or finished products but also to send the information to the financial and production units. The system thus provides a means of controlling all identifying data on a given batch at any moment throughout all the phases of the process.

The traceability cycle is completed with the Warehouse Management System, which supervises all orders. Products are thus identified and placed conveniently creating an inventory stock in real time, which establishes when an order needs to be renewed and to which distributor it should be addressed. And finally, deliveries are tracked daily through the certificate presented by the delivery agents, and the services of a claims department are made available to the retail establishments with a view to resolving any problems.

## Improving processing and marketing

Council Regulation (EC) 1257/1999 of 17 May 1999 concerning rural development aids funded by the European Agricultural Guidance and Guarantee Fund (EAGGF) establishes an aid scheme aiming to improve and rationalise the processing and marketing of agro-food products. The objective of these aids is to support the investments made by agro-industrial businesses with a view to improving the conditions for marketing prime products and gearing production to consumption trends as well as health and environment requirements.

This regulation was incorporated into Spanish law through Royal Decree 117/2001 of 9 February 2001, thus establishing the basic regulations for promoting investments to improve the conditions for marketing and processing agricultural, food and forestry products.

Similarly, the milk industries can apply for the specific aids granted by the various autonomous communities for improving and modernising their structures and modes of organisation. Furthermore, firms situated in Leader Plus or Proder II regions can also apply for support from these rural development schemes.

Milk businesses are also affected by community standards regulating foodstuff labelling, presentation and advertising, the purpose of these standards being to inform and protect consumers without impeding the free movement of food products. In this context, food businesses will in future be obliged to be more specific and rigorous with regard to the statements made on packaging concerning nutrition and health. According to the latest European regulation in the field (which was in the final adoption phase when the present document was being drafted), the European Food Safety Authority



will become the only body authorised to draw up lists of authorised statements, the criteria for including them on the package, and their scientific justification. Until now firms have been allowed to state anything that was not specifically prohibited; with the new regulation the principle has been inverted: all statements which are not expressly permitted will be prohibited.

Furthermore, the programmes for improving milk quality were put into effect in 2005 for the seventh year in succession (MAPA, 2006a). Royal Decree 460/2002 of 24 May 2002, which makes provision for aid for financing advisory measures for improving the quality of the milk produced and collected on farms, lays down the bases for regulating state aids intended as technical support for the milk-producing sector with a view to improving the monitoring and quality of milk at farm level.

## **Traditional products, denominations of origin (DO) and organic farming**

In a context of greater awareness of food safety and growing quality demands, an increasing number of consumers have opted for products which inspire greater confidence such as traditional or organic products and products of differentiated quality, and amongst the latter products those with denominations of origin and organic products are the leaders.

Denominations of origin originated in the historical recognition attributing special qualities highly prized by consumers to the food products of certain geographical areas (a precondition for a denomination of origin) (Herrero, 2006).

In the case of cheese, as with other foods, several European countries have set up various statutory systems for protecting the denominations of origin of cheeses, France being the first country to provide such protection – in 1919 – followed by Italy in 1954 and Spain in 1974 (Herrero, 2006).

The output of cheeses with Protected Denominations of Origin (PDO) and Protected Geographical Indications (PGI) accounted for 5% of total cheese production in Spain in 2003 (compared to 4.5% in 2000). The number of head of cattle entered in the DO registers (which is required by the regulations on DOs) accounts for 4% of cows, 29.3% of ewes and 4.3% of goats. Similarly, the milk output of each of the species that is used for making PDO/PGI cheeses is proportionally lower: 2.8% of cow's milk, 2% of goat's milk and 15% of ewe's milk.

In order to harmonise and develop the existing national legislation at the European level, Council Regulation EEC 2081/1992 of 14 July 1992 on the protection of geographical indications and denominations of origin of agricultural commodities and foodstuffs regulates the application of quality denominations related to the geographical origin of agrifoodstuffs, endeavours to guarantee fair competition amongst producers

and to make these products more credible in the eyes of consumers. In this regulation it is considered that the Community PDO and PGI certification, which corresponds to the name of a region or a placename or, in exceptional cases, the name of the country, serves to designate an agricultural commodity or a food (not the same as a wine or alcoholic beverage) coming from that region, place or country. In the case of PDO products, the quality or features of a product are due mainly or exclusively to the geographical context comprising its natural and human factors, and the product is produced, processed and finished in the delimited geographical area. In the case of PGI products, the product must have a reputation or another feature which can be attributed to that particular geographical origin, and part of its production, processing or finishing process must be carried out in the delimited geographical area.

In Spain, milk and its derivatives are the products which have the largest number of quality marks (excluding wines) that are recognised at the EU level. In concrete terms, farmer's milk is one of the three products that are protected by a Traditional Specialty Guaranteed (TSG). This quality mark protects the production of cow's milk which has certain quality criteria. Furthermore, many PDO/PGI cheeses from areas throughout the country are also recognised in Spain. Spain also has two butters which are protected by a PDO: Soria Butter and Alt Urgell y La Cerdanya Butter.

There are currently 154 registered cheese PDOs/PGIs in the European Union (142 PDOs and 12 PGIs); France leads with 42 of these quality marks, Italy has 31, Greece 20, Spain 19, Portugal 12, the United Kingdom 11, Austria 6, Germany 4, the Netherlands 4, Denmark 2, Ireland 1, Sweden 1 and Belgium 1 (European Commission, 2006).

Table 9 contains the latest figures available on the production of Spanish PDO/PGI cheeses. One observes that the number of denominations rose from 12 in 1998 to 19 in 2002 with a parallel increase in output and volume marketed both on the domestic market and abroad. Over 120 varieties of cheese are marketed in Spain, 25 of which currently have the European quality label (López-Calleja *et al.*, 2006). Table 10 presents the data on PDO cheeses classified according to the origin of the milk used for making them.

As regards organic production, the milk sector is one of the leading animal sectors using organic production methods. There was a total of 89 farms in Spain dedicated to the organic production of milk at the end of 2005. These farms included 42 dairy farms with 2,525 head of cattle, 24 sheep farms (6,781 head of sheep) and 23 goat farms (6,587 head of goats) (MAPA data). The Autonomous Community of Galicia had the largest organically farmed cattle stock with almost 1 400 dairy cows at the end of 2005. At the same time there were 54 plants processing organic milk, cheese or derivatives.

## Quality certification

Certification is an instrument which endeavours to offer the greatest guarantee of safety and/or quality of the product in question while generating value added. As is the case

**Table 9** - PDO and PGI cheese output and marketing, 1998-2002

	Number of PDOs/PGIs	Output (1,000 T)	Volume marketed (1,000T)		
			Domestic market	Exports	Total
1998	12	11.7	9.4	1.2	10.6
1999	13	23.6	10.9	1.7	12.6
2000	16	14.3	10.6	2.2	12.8
2001	17	14.4	10.8	2.4	13.2
2002	19	15.8	11.6	2.7	14.3

Source: MAPA (2002).

in the other food and non-food industries, the implementation of a quality management and certification system in the milk industry, mainly on the basis of ISO Standards 9000, is a practice which, although its growth is not spectacular, is becoming increasingly frequent and is being required more and more in trade relations. The establishment of environmental management and certification systems based on ISO Standard 14001 or in accordance with European Parliament and Council Regulation EC 761/2001 is also a practice that is becoming increasingly widespread; organisations can join a Community environmental management and audit system on a voluntary basis. Table 11 shows the evolution of the certification of quality management and environmental management on the basis of ISO Standards 9000 and 14001 respectively in the Spanish milk industry and in the food industry and Spanish industry as a whole in the period from 1997 to 2004.

The certification of these quality systems has been steadily expanding, due basically to the benefits it brings both to the producer firms and to their suppliers and clients: Lower transaction costs (less bureaucracy, etc.), more extensive possibilities for monitoring and evaluating manufacturing processes and client satisfaction, more clarity concerning responsibilities within the business, etc. There are difficulties, however, in the establishment and certification process: high costs, sometimes low profitability, or even the complexity of the standard in general.

Although the number of certifications in Spain has been steadily increasing, it is still low compared to the total number of existing plants. According to the Central Directorate for Enterprise (DIRCE, 2004) of the National Statistical Institute (INE), the 1,881 certifications issued in the food industry concern only 5.08% of the total number of plants and 4.59% of the total number of certifications issued in Spanish industry as a whole (MAPA, 2006c). In the case of ISO 14001 certifications, the respective figures are 0.62% and 3.6%.

It must be underlined that the number of certifications issued at the sectoral level is generally higher in sectors which are economically more important and more export-oriented, exporting often being an incentive for adopting quality management systems

**Table 10** - PDO cheeses in Spain, data from 2002

	Head of milkproducing animals	Cheese plants	Total (Kg)	Exports (Kg)
<b>Cow's milk PDOs</b>				
Mahón Menorca	5,795	44	2,224,098	92,573
Queso de Cantabria	1,054	4	285,245	0
Q. Del'Alt Urgell Y Cerdanya	11,905	1	167,467	141,419
Queso Tetilla	13,500	28	1,818,700	68,390
Total	32,299	77	4,495,510	302,382
<b>Ewe's milk PDOs</b>				
Idiazábal	125,000	89	1,090,134	69,434
Q. de La Serena	97,716	14	175,250	16,000
Q. Manchego	670,896	82	6,408,379	2,221,670
Q. Zamorano	43,334	10	302,403	27,355
Roncal	51,467	5	491,035	18,893
Torta del Casar	19,100	8	157,593	3,000
Total	1,007,513	208	8,624,794	2,356,352
<b>Goat's milk PDOs</b>				
Q. Ibores	27,840	6	86,265	22,123
Q. de Murcia al Vino	-	-	203,028	30,454
Q. de Murcia	28,406	7	14,320	716
Q. Majorero	17,347	21	337,065	8,175
Q. Palmero	698	6	6,010	0
Total	74,291	40	646,688	61,468
<b>Mixed milk PDOs</b>				
Cabrales	8,704	50	515,479	0
Picón Bejes-Tresviso	895	11	35,000	0
Quesucos de Liébena	931	8	47,883	0
Total	10,530	69	598,362	0
<b>Grand total</b>	<b>1,124,633</b>	<b>394</b>	<b>14,365,354</b>	<b>2,720,202</b>

Sources: MAPA (2002) and the inter-trade organisation in the milk sector (INLAC).

that are recognised at the international level. The exporting dimension is particularly significant in the case of ISO 14001 certifications, since most certified businesses are in highly export-oriented sectors (wines, fruit and vegetables, olive oils) and much less significant in sectors where production processes have a greater environmental impact (sugar industries, breweries, meat and milk product manufacturing).

**Table 11** - Certification of quality assurance and management systems (ISO 9000) and of environmental management systems (ISO 14001) in the Spanish milk industry, 1997-2004

	ISO 9000 Standards			ISO 14001 Standards		
	Milk industry	Total food industry	Total industry	Milk industry	Total food industry	Total industry
1997	23	247	4,268	1	3	92
1998	5	99	2,144	0	7	72
1999	10	122	2,287	1	12	409
2000	5	173	3,877	1	11	27
2001	3	177	5,173	2	43	1,464
2002	13	216	10,941	3	39	1,164
2003	14	324	3,146	6	40	1,632
2004	18	523	9,136	4	78	1,613
<b>Cumulated total</b>	<b>91</b>	<b>1,881</b>	<b>40,972</b>	<b>18</b>	<b>233</b>	<b>6,473</b>

Source: MAPA (2006c).

## Structure of the industry and corporate strategies

### Structure of the industry

Cow's milk is by far the most important raw material in industrial milk product manufacturing in Spain, accounting for 80% of the final output in equivalent volume (16% in the EU). It is followed by yoghurts and other fresh products, accounting for 12% (3.5% in the EU), cheese products, accounting for 2.6% (32% in the EU), and butter, accounting for 0.7% (23% in the EU).

The results of the processing industry are weakened by this composition of final output, where the emphasis is on liquid milk, which generates a very limited profit margin, and the industry's capacity for investment and growth is consequently limited. This situation is compensated in part by the growing production of yoghurts and fresh derivatives, where profit margins are higher, Spain being one of the countries where the level of consumption of these products is higher. On the other hand, although cheese products have generally high value added, cheese output is still relatively low.

According to INE data, there were 1,007 milk processing businesses in Spain in 2004 – 10.2% more than in 2000, mainly as the result of the establishment of new cheese-making firms. Tables 12 and 13 show the basic structural indicators and the composition of the value of the output of firms in the Spanish milk industry. Milk

industry sales account for approximately 10% of the total output of the food industry and 2% of the output of Spanish industry as a whole (Alforja, 2006).

As regards the milk-processing industry more specifically, according to the results of the Survey on Milk Sector Structures conducted by the MAPA in 2005 there are 604 milk treatment businesses, 5 of which account for 40% of the total volume of milk treated, and the 21 leading firms account for 74%. The 503 smaller businesses account for 4.8% of the total volume. The milk industry is thus a relatively concentrated industry with a structure typical of an open oligopoly (a limited number of operators with strong marketing power coexist with a large number of small scattered businesses with very little specific weight).

**Table 12 - Fundamental indicators of the Spanish milk industry**

	Number of businesses	Cost/employee (euros)	Output/employee (euros)	Employees/business	Total number of employees	Output value (1,000 euros)	% value added/value
2000	913	25,683	249,398	28	27,745	7,362,664	21.1
2001	959	27,225	272,076	30	27,128	7,038,106	18.2
2002	1,000	30,198	313,988	26	26,648	8,051,596	20.7
2003	965	30,452	311,087	27	25,914	8,061,511	21.2
2004	1,007	31,206	319,891	27	27,024	8,644,752	20.4

Source: INE, 2001-2005.

**Table 13 - Composition of output value in the Spanish milk industry (%)**

Item	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Personnel	13.7	13.4	12.4	11.9	11.5	11.0	11.1	10.0	10.5	10.4	10.5	9.7
Energy	8.5	8.0	9.6	10.4	10.7	10.5	11.2	9.2	10.4	9.9	10.1	9.0
Raw materials	52.7	52.1	53.5	51.2	50.6	52.2	48.7	45.4	51.9	50.4	49.6	44.9
Contingent expenses, amortisation	16.0	16.7	16.2	17.6	17.1	17.5	19.0	27.2	18.4	19.1	19.0	25.6
Profitability	9.1	9.9	8.4	8.9	10.0	8.8	10.0	8.2	8.9	10.3	10.8	10.7

Source: INE, 1994-2005.

## Analysis of milk businesses

Except for micro and small enterprises specialising in market niches such as traditional cheeses and/or cheeses protected by DOs, the businesses in the milk sector are developing their activities in one or several segments and in one or several phases of the production and marketing chain. This phenomenon is promoted in particular by the variety of possibilities of processing milk into different products. Many firms combine

activities in various categories; there are three main segments: liquid milk, fresh derivatives (yoghurts and fresh desserts) and cheeses.

The businesses in the liquid milk sector process by far the largest volume of milk and thus play a decisive role in the fixing of farm gate prices. Negotiation with the large-scale retail trade is particularly difficult, since the latter firms have to diversify and achieve large volumes of sales in view of their limited profit margins.

Firms in this segment focused initially on semi-skimmed and skimmed milks in their diversification efforts and then gradually included the whole range of functional and enriched milks, buttermilks, etc. This qualitative leap enabled them to increase their liquid milk profit margins. Most of the major enterprises operating in the liquid milk sector are located in geographical regions where large volumes of milk are produced. Small firms operate on local markets and generally produce pasteurised milk.

The current structure of businesses is to a large extent the result of a progressive concentration process, which has continued parallel to the concentration of the European milk industry, although the average size of firms is still smaller than in other EU countries. There have been several contributing factors such as the closure of former milk plants, which led to industrial concentration, the expansion of uperised (UHT) milk packed in “brick packs”, the strategies of the large-scale retail trade, the withdrawal of the public sector, and the policies pursued by the Autonomous Communities with regard to the milk enterprises operating in their regions. It is of course a dynamic process which is constantly developing.

The enterprises in the liquid milk sector are extremely dynamic, focusing mainly on products with a higher value added, which compensates – at least in part – for the fact that demand is levelling off or even decreasing in the conventional milk ranges. The main characteristics of this segment are concentration, the rapid increase in retail brands, the sudden emergence of groups of primary producers in the industrial phase, and the arrival of international capital. The main enterprises on the liquid milk market are listed in Tables 14 and 15 by volume of long-life and pasteurised milk collected and processed. The leader in this segment (CAPSA) collected a volume of 1000 million litres in 2004, producing 725 million litres of liquid milk; the firm second in rank (Puleva) collected 800 million litres and produced 650 million litres; the third firm (Leche Pascual) collected 775 million litres and produced 584 million litres; and the fourth firm (Lactalis) collected 650 litres and produced 550 million litres. There are no significant changes in these firms’ rankings from one year to the next.

As regards market shares, the figures supplied by the IRI Spain for 2005 show that the three main brands on the liquid milk market are CL Asturiana with a 13.5% share of sales volume and a 15.3% share of value, Puleva with 11.4% and 15.8% respectively, and Pascual with 10.4% and 12.2% respectively (Table 15). The fourth brand (Celta) lags far behind with only 3.6% of sales volume and 3.7% of value, and the figures for

the fifth brand are 2.8% and 2.9% respectively. On the other hand, the remarkably rapid development of retailer brands must be underlined, which accounted for 36.8% of sales volume and 29.5% of sales value in 2005. The pressure which retail brands exert on prices (combined with other factors such as the rise in farm gate prices due to an inadequate milk quota) and stiff competition have led the segment to place itself in milk ranges with higher value added, installing its own plants on foreign markets, particularly in Portugal, in order to guarantee the supply of raw material at competitive prices.

**Table 14 - Principal milk groups in Spain by volume of milk collected (million litres)**

Group / enterprise	Milk collected in 2003 (million L)	Milk collected in 2004 (million L)	Net sales 2004 (million e)
Corp. Alimentaria Peñasanta, S. A.	1,000	1,000	665.5
Puleva Food, S. L.	825	800	497.1
Leche Pascual España, S. L.	721	775	506.0
Grupo Lactalis	650	650	430.0
Leche Celta, S. L.	462	533	274.2
Danone, S. A.	475	500	1,115.0
Iparlat-Kaifu	390	400	250.0
Forlactaria Operadores Lecheros, S. A.	250	300	110.0

Source: Alimarket Revista, 190, 2005.

The fresh derivatives segment in Spain is dominated by the industrial group Danone, as is the case throughout Europe. The development of the segment has been connected with research and development, innovation, promotion and the advertising of new products. In practice, there are a very few businesses which carry out research in order to produce radically new products. It is widespread practice to use more or less modified copies of new products. Investment in research and promotion is the main strategic factor enabling an enterprise to maintain a leading position in this segment.

There is a fairly limited number of firms specialising in this type of product. Most of them also produce drinking milk. Retailer brands have also penetrated the segment and have acquired a market share close to 30%. There are currently several firms producing retail brands. Some firms include fresh cheeses in their range of products, a segment where they compete with cheese-making firms. There are also small businesses with a local market and businesses specialising in traditional products (curdled milks).



**Table 15 - Main firms processing long-life and pasteurised milk (million L)**

Group/enterprise	Location	2003	2004	Brands
Corp. Alimentaria Peñasanta, S. A.	Granda-Siero (Asturias)	721	725	C. L. Asturiana / Ato / Larsa
Grupo Puleva	Granada	694	650	Puleva / Ram / El Castillo
Grupo Leche Pascual	Aranda de Duero (Burgos)	577	584	Pascual / PMI / Frixia
Grupo Lactalis Iberia, S. A.	Madrid	-	550	President / Lauki / Prado
Leche Celta, S. A.	Pontedeume (A Coruña)	434	510	Celta / Campobueno / La Vaquera
Iparlat, S. A.	Pamplona (Navarra)	315	350	Kaiku / Beyena
Leite Rio S. L.	Láncara (Lugo)	226	300	Rio / Cremosita / Solán / Leyma
Coop. Gan. Valle Pedroches (COVAP)	Pozoblanco (Córdoba)	150	175	COVAP
Ind. Lacteas Asturianas, S. A.	Navia (Asturias)	125	120	Reny Picot / la vaquita
Coop. Feiraco	Negreira (A Coruña)	118	110	Feiraco / Xoia
Lactogal, S. A. Suc. en España	Madrid	65	90	Primor / Plena
Clesa, S. A. (Grupo)	Madrid	80	76	Clesa
Jose Sanchez Peñate, S. A.	Las Palmas de G. Canaria	60	60	Lilac / JSP
Unilever Foods España, S. A.	Lamiako (Vizcaya)	27	30	Flora
Leche Caza, S.L.	Zamora	29	30	Gaza
Quesos Frias, S. A.	Burgos	30	30	Frias
Serv. Ins. Abas. Leche, S. A. (SIALSA)	Las Palmas	22	22	Sandra
Llet De Catalunya, S. L.	Vic (Barcelona)	-	20	Llet Nostra
Agama, S. A.	Palma de Mallorca	18	20	Agama
Prod. De Calidad Cañada Real, S. A.	Soria	20	20	C. L. Soriana

Source: Alimarket Revista, 190, 2005.

It must be pointed out that the preponderance of retail brands and the high level of corporate concentration are the two most typical features of the firms producing and marketing yoghurts and fresh milk desserts. Tables 16 and 17 present data on the location, commercial brands and output of the main firms producing yoghurts and fresh

desserts in 2003 in 2004. The principal operators in this segment are major multinational groups and some of the biggest Spanish enterprises producing liquid milk, which are attracted by the advantageous commercial margins and trading opportunities which this segment presents.

Danone, the leading firm in terms of sales of yoghurts and fresh milk desserts, produced 318,345 tonnes of yoghurt in 2004 and 43,714 tonnes of fresh milk desserts. The Senoble Ibérica group, which specialises in retail brands, produced 115,600 tonnes of yoghurt and 25,000 tonnes of milk desserts. The third group in the yoghurt segment and fifth in the dessert segment produced 68,000 tonnes and 18,000 tonnes respectively.

**Table 16 - Main yoghurt-processing firms (T)**

Group/enterprise	Location	2003	2004	Brands
Danone, S. A.	Barcelona	310,000*	318,345	Danone
Senoble Ibérica, S. A. <sup>(1)</sup>	Torrejón de Ardoz (M)	89,000*	115,600	...
Nestlé España, S. A.	Espulges de Llobregat (B)	65,000	68,000*	Nestlé
Láctea Antequerana, S. L.	Antequera (MA)	60,000	60,000	La Vega
Copor. Alimentaria Peñasanta, S. A	Siero (AS)	52,600	55,000	Central Lechera Asturiana
Clesa, S. A.	Madrid	40,000	40,000	Clesa
Iparlat, S. A.	San Sebastián	35,000	40,000*	Kaiku
Leche Pascual, S. A.	Aranda de Duero (BU)	30,300	31,900	Pascual/PMI
Lactalis Ibérica, S. A. <sup>(1)</sup>	Madrid	26,000	28,000*	...
Lácteos Campina, S. A.	Barcelona	25,000	23,500	Mondelice
Grupo Kalise Menorquina, S. A.	Las Palmas	10,000*	10,300	Kalise
José Sánchez Peñate, S. A.	Las Palmas	6,000*	6,500	Millac
Puleva Food, S. L.	Arteixo (C)	6,000*	6,500*	Puleva
Feiraco, S. Coop.	Negreira (C)	2,900	3,000	Feiraco
Coop La Fageda	Santa Pau (GI)	2,500*	2,234	Fageda

Source: Alimarket Revista, 190, 2005. - \* Estimation

(1) Marque de distribution

In terms of yoghurt market shares, according to Alimarket data for 2005, the leading firm (Danone) accounts for 49.4% of sales in volume and 64% in value. Retail brands come second with 39.2% and 24.3% respectively. The firm ranking second (Nestlé) accounts for lower percentages with 3.5% in volume and 3.4% in value, whereas the third firm (C. L. Asturiana) accounts for 3.4% in volume and 3.3% in value.

**Table 17 - Main firms processing fresh milk desserts (T)**

Group/enterprise	Location	2003	2004	Brands
Danone, S. A.	Barcelona	40,000*	43,714	Danone
Senoble Ibérica, S. A. <sup>(1)</sup>	Torrejón de Ardoz (M)	20,953	25,000	...
Postres y Dulces Reina, S. L.	Caravaca de la Cruz (MU)	10,516	21,900	Reina
Grupo Dhul, S. A.	Granada	20,000	20,000*	Dhul
Nestlé España, S. A.	Espluges de Llobregat (B)	19,000*	18,000*	Nestlé
Clesa, S. A.	Madrid	12,000	10,500	Clesa
Iparlat, S. A.	San Sebastián	8,000	9,000*	Kaiku
Leche Pascual, S.A.	Aranda de Duero (B)	8,500	8,100	Pascual/ PMI
Corpor. Alimentaria Peñasanta, S. A	Siero (AS)	4,000	5,000*	Central Lechera Asturiana
Lácteos Campina, S. A.	Barcelona	1,400	3,000	Mondelice
Grupo Kalise Menorquina, S. A.	Las Palmas	2,100*	2,200	Kalise
Montera Alimentación, S. L.	Málaga	1,800	2,000	Montero
Lácteos Doncel, S. L.	Irún (GUI)	1,250	1,550	Doncel
Lácteos Goshua, S. L.	Iraizoz (NA)	1,000*	1,100*	Goshua
Coop La Fageda	Santa Pau (GL)	750*	577	Fageda

Source: Alimarket Revista, 190, 2005 – \* Estimation

(1) Marque de distribution

In the case of milk desserts, retail brands come first with 46.7% of sales in 2005, but accounted for only 32.4% of value. Danone accounted for 32.3% of sales in volume and 39.6% in value, followed by a group of brands lagging far behind – Nestlé with 6.3% in volume and 8.6% in value, Dhul with 4.9% and 7.8%, Reina with 3.4% in volume and in value, C.L. Asturiana with 2.4% and 2.3%, and Clesa with 1.5% and 1.4%.

And finally, in the cheese segment, the vast majority of undertakings were very small until recently, with virtually craft-enterprise structures. This has been changing in the past few years, however, and there is now a marked trend towards concentration, increase in output volumes and penetration of foreign capital. There are thus two clearly differentiated types of business which coexist in the sector – a large number of small and medium-sized producers, on the one hand, who make cheeses on a semi-artisan basis protected by the various denominations of origin, whereas in the upper part of the structure a small group of industrial manufacturers produce large volumes that are geared mainly to exports.

Table 18 presents the figures on the main undertakings manufacturing and importing cheeses according to location, brand-name and volume produced in 2003 in 2004. The main group (TGT) achieved a volume of 83,344 tonnes in 2004 between production and imports, whereas the group ranking second (Kraft Foods España) achieved a volume of 36,500 tonnes.

The cheese segment presents a heterogeneous business environment and a wide variety of categories, which can be classed as follows: PDO/PGI cheeses are many and varied but most of them are produced in small quantities. This is a highly profitable activity on the whole, the products bringing high added value. It is a category where there is little innovation, due mainly to the inflexibility of regulating councils and the lack of any real innovatory culture. Similarly, cheeses are frequently made on the farm in this category, both by self-employed producers and by small cooperatives or agricultural processing companies, with the well-known management problems and lack of appropriate marketing strategies. In these cases, the fact that firms are small (particularly in the case of certain varieties) causes problems regarding integration into modern distribution channels, since volumes are not supplied regularly.

These segments are followed by traditional hard cheeses (similar to La Mancha cheeses but not recognised as PDO or PGI products) and most of the cheeses produced with a mixture of cow's, ewe's and goat's milk. The firms in this category are generally medium-sized with professionalised management models and marketing departments. Spanish firms, which in many cases started as family firms, coexist in this segment with subsidiaries of multinationals, particularly French multinationals. Here again the trend is towards concentration via mergers, takeovers or expansion moves, and towards diversification with a view to optimising the mixture of milks with which the firms operate.

Fresh cheeses come third in line, and they are a category that is steadily expanding. They are produced by specialised firms as well as by other businesses which have more diversified activities but still within the cheese segment. The level of innovation is rising in this category, mainly as regards aspects connected with the sale of packed products (packaging material and packaging quality) and preservation.

And finally, there is the category of non-Spanish cheeses and other conventional non-fresh cheeses including varieties of cream cheeses, cheese balls, cheese bars, etc. The biggest firms operate in this category – both Spanish and European firms, mainly French. Specialised firms coexist with dairies, which have entered the cheese-making market. The leading firms have a wide variety of ranges and formats for the final products. They have recently introduced radical innovations with the support of substantial public investments. The degree of concentration of these firms is also increasing. Some of the lesser firms focus most of their activities on local or regional markets, whereas others specialise in supplying catering companies and commercial restaurants or in producing pre-cooked foods.

**Table 18** - Main cheese importing and processing firms (T)

Group/enterprise	Location	2003	2004	Brands
Grupo TGT	Viladecans (B)	76,200	83,344	TGT/Bergader/ Entremont/Frico
Kraft Foods España. S. A.	Madrid	36,500*	36,500*	Kraft/El Caserío/ Philadelphia/Mama Louise
Quesos Forlasa. S. A.	Villarrobledo (AB)	33,600*	32,500*	El Ventero/Campobello/ D. Bernardo/Gran Capitán
Mantequerías Arias. S. A.	Madrid	32,500*	30,000	La Cabaña/Burgo de Arias/ S. Millán/Boffard/Angulo
Lácteos García Baquero. S. A.	Alcázar de San Juan (CR)	30,000	18,000*	García Baquero/ Villacenteno
Arla Foods. S. A.	Madrid	18,000*	10,500	Arla/Apetina/Finello/ Dofino
Lactalis Iberia. S. A.	Madrid	13,000	14,000*	President/Société
Lácteos Del Jarama. S. A.	Madrid	12,500	14,000	Albe
Quesería Entrepinares. S. A.	Valladolid	9,985	14,000	Entrepinares
Quesería Lafuente. S. A.	Santander	10,298	12,643	Quescan
Iber Conseil. S. A.	Barcelona	6,693	12,000	Westlander/Even/ Rippos Unicopa/Paladín
Coop. Alim. Peñasanta, S. A.	Granda (AS)	9,400	9,500*	Central Lechera Asturiana
Luxtor. S. A.	Avila	9,000*	9,000*	Luxarela
Coop. Cadi	La Seu d'Urgell (L)	8,110	8,470	Cadí
Ind. Lácteos Aasturianas. S. A.	Madrid	7,000*	7,000*	Reny Picot/Montelarreina
Hijos De Salvador Rodríguez. S. A.	Sta. Cristins Polvorosa (ZA)	6,000	7,000	El Pastor
Gregorio Díaz Miguel. S. A.	Alcázar de San Juan (CR)	6,300	6,300	Record/Díaz Miguel
Grupo Fromageries Bel España, S. A.	Madrid	5,100	6,100	La Vaca que Ríe/ Mini Babybel/Leedamer
Coop. Agraria Del Pirineo	La Pobla del Segur (L)	6,000	6,000*	Copirineo
Lácteos Campina, S. A.	Barcelona	4,500	5,100	Campina

Source: Alimarket Revista, 190, 2005.

\* Estimation

## Conclusion

The Spanish milk sector presents structural situations, diversity and dynamism which varies widely from one firm to another. At the primary production stage, structures are still fragmented and the level of articulation is low, despite the concentration efforts that have been underway over the last 10 years; there are some 29,000 dairy farms, most of which are family farms, in which investment level is low, plus a large number of craft enterprises. At the collection and industrial processing stage, on the other hand, a small number of large groups predominate with a diversified supply of products, more developed vertical control of the production chain and a high capacity for innovation and promotion; these groups include several subsidiaries of large multinationals.

The milk sector has been one of the first food sectors in Spain to move closer to the dominant model in the other European countries. With the exception of traditional cheeses, the sector's ranges of products and marketing strategies are currently comparable to those predominating on the most developed markets in the EU.

Imports are an inevitable necessity, since liquid milk output is far from satisfying domestic demand. Efforts to seek the raw material are thus an essential strategy for the sector's survival. Several Spanish milk businesses have set up production plants in other countries as a partial remedy for the chronic milk shortage in the sector.

The 2003 reform of the CMO for milk and milk products brought important changes, which affect the entire sector; they include the abolition of the target price, the reduction of the intervention price for butter and powdered skimmed milk, the total decoupling of aids for agricultural production, and the progressive reduction of export subsidies, which will make the European and Spanish milk industry less competitive, particularly on foreign markets. As a result, there is now great uncertainty in the Spanish and European milk sector, which makes it imperative for producers, industrialists, distributors and the public authorities to collaborate more intensively.

Against this background the improvement of food quality and food safety has emerged as a crucial objective for the various operators in the milk and milk product supply chain. The various Community and national regulations in the field and their implementation as well as the various private initiatives launched by businesses themselves have been decisive. Furthermore, the growing awareness in public opinion of food safety issues combined with the increasing demand for quality in all of its dimensions has been a decisive factor in inducing producers to supply quality foods such as products with a denomination of origin label and organic products.

Analysis of consumption and in particular of the per capita consumption levels of the past few years reveals that the Spanish liquid milk market is completely saturated, with a slightly downward trend in demand. At the same time, the consumption of processed milk products, especially cheese and fresh derivatives, has been steadily

increasing over the recent period. The information available indicates that these two trends will continue in the future.

The analysis conducted also shows the crucial importance of innovation in this sector. In fact, in the case of all milk products the increases in consumption in Spain are related to new products or new presentations. This is confirmed in particular in the range of fresh milk derivatives, where there has always been a high innovation rate. Furthermore, innovation is spreading to all ranges of products comprising a large number of functional or special foods. It can be stated that, in addition to production concentration, quality and vertical integration strategies as well as innovation constitute the fourth crucial competitiveness factor in this sector.





# THE MILK AND MILK PRODUCT SECTOR IN MOROCCO

*Akka Ait El Mekki*

The animal husbandry sector plays an important role in the Moroccan economy through its contribution to the gross agricultural product (30%), the employment it provides in rural areas and also by satisfying consumer needs in the animal product field. Dairy farming is one of the main components of this sector, in which there are two main production systems. The first, the intensive farming system, is practised essentially in the hydro-agricultural development areas managed by the Agricultural Development Offices (ORMVA). It is characterised by abundant fodder resources, the predominance of improved cattle breeds in herd structure (70%) and the high level of milk marketing (60% to 70% of total output). The second system, which is more mixed (milk and meat production), is based on concentrated feed and the use of cereal by-products (straw, stubble, etc.). It predominates in areas with favourable rainfall and around the major conurbations.

Although national production covers around 90% of consumer demand for milk and milk products, that demand is still below the needs recommended by nutrition standards. What is more, the entire industry is increasingly concerned by aspects of product quality as the result of the opening of the economy and new consumer requirements. While describing how the milk industry operates, the present chapter aims to enumerate the main data on quality determinants at the various stages of production and marketing. It begins with a brief overview of milk production policy in Morocco. In the second section the trends in milk and milk product consumption are described, and the main provisions laid down in quality regulations are outlined. The last two sections contribute to the analysis of the data on the structures of the milk industry and milk marketing channels, with particular emphasis on the quality strategies of production plants.

## Overview of milk production policy in Morocco

State policies in the animal husbandry field aim to consolidate food security in the meat and milk product sector. As regards milk production, the public authorities have been intervening since the 1970s through programmes aiming to improve production

efficiency and boost milk product consumption. An initial milk programme was launched in the mid-1970s in this context, aiming primarily to improve self-sufficiency and to boost per capita consumption of milk products from 0.1 to 0.33 litres of milk per person per day in the period from 1975 to 2000 (Srairi, 2004). In order to achieve this objective state intervention was necessary through the following lines of action (Ministry of Agriculture, 2000):

- genetic improvement of cattle stock through artificial insemination and by crossing animals with improved breeds,
- action to step up measures to improve animal health and milk product safety,
- action to improve fodder resources and build up emergency stocks of animal feed,
- establishment of milk collection centres in the vicinity of production areas,
- investment incentives to boost the establishment and development of milk processing plants.

These measures resulted in an improvement in milk output, which rose from 580 million litres to 1.1 billion litres in the period from 1975 to 1999. However, in view of the production deficit compared to consumption needs the public authorities adopted a second milk plan for the period from 2000 to 2020. Contrary to the 1975 programme, this scheme laid emphasis on the regional specialisation that was necessary for rationalising the use of resources and improving productivity. It focused on improving the health and environment of dairy stock, improving milk quality at all the various stages in the production chain, support for producers' organisations and measures to strengthen the policy of inter-trade partnership (Araba *et al*, 2001). Most of the incentives involved in the Ministry of Agriculture's intervention in this field (e.g. construction and equipment of cowsheds and collection centres) were supported by the Agricultural Development Fund.

Current milk output amounts to almost 1.37 billion litres (Ministry of Agriculture, 2005), but it is still below the projections formulated in the 1975 milk programme (2 billion litres by 2000). Livestock performance, climate conditions (particularly rainfall) and the constraints related to the organisation of the profession are often regarded as determinants in the performance recorded. Other constraints connected with the collection, processing and distribution of milk and milk products also affect the levels of qualitative availability of these consumer goods. The strategy for developing the milk industry elaborated in the 2000-20 scheme takes account of all of these constraints. The main objective is to increase output by 5.8% each year in order to cover nutritional consumer needs in terms of milk product consumption (Ministry of Agriculture, 2000).

Furthermore, Morocco imports an average of some 15,000 tonnes of powdered milk each year, i.e. the equivalent of 151 million litres of reconstituted milk. The bulk of these imports comes from the European Union, which accounts for almost 85% of the quantities imported. In the period from 2000 to 2004, France was considered the main supplier of this product, accounting for almost 30% of imports, followed by the Netherlands

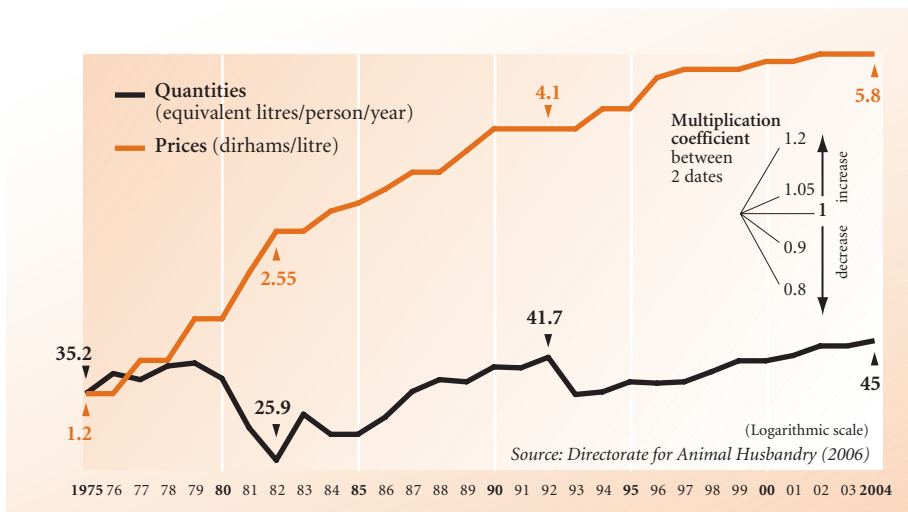
(12%), Germany (11%), Spain (7%) and the Belgo-Luxembourg Economic Union (7%). Milk and milk products are subject to customs tariffs ranging from 17.5% (cheese for industrial use) and 112% (fresh milk and milk cream). A customs duty of 60% is levied on powdered skimmed milk, whereas the duty levied on powdered whole milk is 112%. These tariffs can sometimes be reduced in order to encourage imports in certain periods when consumption is high such as during the month of Ramadan. However, the policies for dismantling tariffs are a matter of concern for farmers and even processors, particularly with regard to commitments in the context of the Association Agreement with the European Union and the Free Trade Agreement with the United States.

### Consumption trends

The current milk product consumption level is still relatively low at almost 45 equivalent litres of milk per person per year compared to the recommended 90 litres for the nutritional ration (Ministry of Agriculture, 2005).<sup>1</sup> This individual consumption increased by almost 10 litres between 1975 and 2004, i.e. at an average annual growth rate of 0.8% (Chart 1).

The consumption trend shows a marked drop at the beginning of the 1980s due mainly to serious drought problems in the country at the time, which affected output levels. In 1983, individual consumption, at 25 litres per person per year, was even lower than the level registered at the beginning of the 1970s. Since then, the recovery rate has risen steadily to reach the levels currently recorded.

**Chart 1 - Trend in milk product consumption and prices, 1975-2004**



<sup>1</sup> - According to the classification which the Directorate for Statistics (2005) adopted for the survey conducted in 2000/2001 on household consumption and expenditure, the group of milk products comprises unprocessed milk, pasteurised milk including long-life milk (UHT), concentrated milk, powdered milk, whey, cheese, powdered milk for babies and the other products including in particular yoghurts, raibi, curdled milk and fresh cream.

In terms of budget expenditure, the results of the household consumption and expenditure survey conducted by the Directorate for Statistics in 2000/2001 show that average annual expenditure on milk products is approximately 210 dirhams (dh) per person per year at the national level.<sup>2</sup> The cost of purchasing pasteurised and sterilised milk accounts for almost 50% of that expenditure, followed by the cost of unprocessed fresh milk – almost 34 dh/person/year, i.e. 16% of total expenditure on milk. The share of the other products ranges from 10% for the “Other milk products” group to 0.3% for concentrated milk (Table 1). Analysis of demand shows, however, that fresh milk accounts for 65.3% of average expenditure on milk products.

**Table 1 - Average annual expenditure on milk products in Morocco (current dirhams)\***

Commodity	Urban		Rural		Total	
	Value	%	Value	%	Value	%
Unprocessed fresh milk	24.1	8.0	45.7	50.5	33.6	16.1
Pasteurised milk and sterilised UHT milk	172.5	57.0	14.8	16.4	102.9	49.2
Concentrated milk	0.9	0.3	0.4	0.4	0.7	0.3
Powdered milk	15.5	5.1	6.9	7.6	11.8	5.6
Whey	19.7	6.5	15.1	16.7	17.7	8.5
Cheese	30.2	10.0	1.2	1.3	17.4	8.3
Other milk products	32.9	10.9	3.9	4.3	20.1	9.6
Milk and milk products for babies	6.7	2.2	2.5	2.8	4.9	2.3
<b>Total expenditure (dh)</b>	<b>302.5</b>	<b>100</b>	<b>90.5</b>	<b>100</b>	<b>209.1</b>	<b>100</b>

Source: Directorate for Statistics (2005) – (\*) 1 dirham = 0.094 euros.

Compared to the results of the household consumption survey carried out in 1985, one notes a progressive rise in expenditure on milk products, which actually increased by 230% in the period from 1985 to 2001, from almost 92 to 210 dh per person per year. The budget share of milk products in overall food expenditure thus rose from 5.2% to 6.1% at the national level. Compared to expenditure on staples, the budget share of milk estimated in 2001 was lower than that of cereals (20.4%), meat (22.7%) and fats (8.6%). The principal determinants in milk product demand are discussed below on the basis of the results of the survey conducted by the Directorate of Statistics on household consumption and expenditure.

## Factors influencing milk product consumption

In addition to prices, which are one of the most determinant variables in demand, there are other factors which influence milk product consumption in Morocco. It is essentially a question of the level of household income and the residential environment.

2 - 1 Moroccan dirham = approximately 0.094.

### *Price trends*

The consumer price of 1 litre of milk depends on the high and low lactation periods but also on marketing channels. In 2004, the average price was 5.80 dh compared to a producer price of 3.2 dh. The difference between the two prices clearly shows an average marketing margin estimated at 82%, which indicates the significance of the downstream stages in the milk production chain.

Expressed in current terms, the consumer price has been rising since 1975, when it was 1.2 dh per litre (see Chart 1 above). The average annual rate of increase in prices between 1975 and 2004 was consequently almost 5.6%. It is important to note, however, that in real terms expressed according to the consumer price index based on the 1989 figures the price of milk remained relatively constant around 3.5 dh/litre.

### *Effects of household income and the residential environment*

In its 2001 survey on household consumption and expenditure, the Directorate for Statistics (2005) shows that the quantity of milk products consumed was just over 53 litres of fresh milk equivalent (FME) (Table 2). This quantity was limited to almost 18.4 FME in rural areas, resulting in a significant difference in the budget coefficient allocated to these products by consumers. For consumer expenditure on milk products in urban areas was over 3.3 times the rural level, the respective figures being 303 dh and 91 dh/person/year.

Furthermore, the same survey made a distinction between five categories of consumer expenditure in both rural and urban areas. These classes correspond to income quintiles from the poorest households (quintile 1) to the richest (quintile 5) and thus provide pertinent information on the effect of income on milk product consumption. At the national level, the richest households consumed 10 times the volume of milk products consumed in the poorest households. Practically the same difference is found in urban areas with respective quantities of almost 100 FME and 10 FME per person per year. In relative terms, the difference is less serious in the rural population, where individual consumption is 54 FME in the case of the richest households and 9 FME in the case of the poorest.

The sensitivity of milk product demand in relation to income is confirmed by the econometric estimations carried out in various studies on food product consumption. The national survey on household living standards conducted in 1998/1999 (Directorate for Statistics, 2001) is one of the best referenced studies, since it is based on a representative sample of the consumer profile of the Moroccan population. The results of that survey show that milk and milk products have an income elasticity of 1.11 at the national level. This elasticity is much higher in rural areas (1.19) than in urban areas (1.02).

**Table 2 - Quantity consumed (FME)\*, expenditure (dh) and food budget share according to income bracket and the residential environment**

Category		Urban	Rural	Total
1	Quantity	10.1	8.81	9.12
	Expenditure	55.8	41.4	44.9
	%	4.0	2.8	3.1
2	Quantity	19.24	15.6	17.1
	Expenditure	103.7	75.4	87
	%	5.2	3.3	4.0
3	Quantity	30.29	21.17	26.24
	Expenditure	165.6	104.9	138.7
	%	6.1	3.4	4.8
4	Quantity	46.75	28.88	41.69
	Expenditure	260.5	146.3	228.2
	%	6.9	3.6	5.9
5	Quantity	100.65	54.14	94.63
	Expenditure	587	279.4	547.2
	%	8.6	4.3	8.1
Total	Quantity	53.07	18.35	37.75
	Expenditure	302.7	90.7	209.2
	%	7.5	3.4	6.1

Source: Directorate for Statistics (2005) – (\*) FME: fresh milk equivalent.

Milk products thus have the same economic characteristics as luxury goods, particularly in rural areas. Despite the role that rural households play in milk production, they seem to tend to prefer to sell milk in the various marketing channels and to replace it in their diet by tea in particular. It is an efficient way to help to resolve cash flow problems. The income from the sales is used to buy feedstuffs (cereal bran, dried beet pulp, etc.) as well as foodstuffs for the family (tea, sugar, oil, etc.). Rural households' tendency to sell is also to be explained by the fact that they do not have the necessary equipment to conserve milk products properly.

## Milk derivative consumption trend

In addition to the different types of milk consumed (namely raw milk, pasteurised milk, UHT milk, concentrated milk and powdered milk), the main milk derivatives include yoghurts, fermented milks and cheese.<sup>3</sup> The trend in the consumption of the various products can again be seen in the results of the household surveys conducted by the

3 - Although butter is a milk derivative, it is always classed in the fats group in human consumption.

Directorate of Statistics. The two most recent and most representative surveys were carried out in 1985 and 2001. Since the second survey was carried out at a sufficiently long interval after the first, the results clearly show the trend in the milk basket in both urban and rural areas.

Table 3 shows that fresh milk demand increased at the national level from almost 17.6 FME to a little over 26.6 FME/person/year, i.e. an average annual growth rate of 2.63%. This increase is due in particular to the increase in the consumption of pasteurised milk, where the annual growth rate is 3.24%. The consumption of this type of milk has increased in rural areas – from 0.88 FME to 2.47 FME/person/year in the period from 1985 to 2001. The increase in the demand for unprocessed milk, which is sold mainly by street traders, remains stable at an average annual rate of almost 1%. Surprisingly, it is urban demand which has been the main cause of this increase, rising from almost 3 FME to 5.35 FME/person/year over the same period, i.e. an estimated growth rate of 3.7% per year. This result is no doubt due to the role played by informal milk marketing channels in the supply of milk to towns and cities (Ait El Mekki *et al*, 2002).

With regard to derivatives other than cheese, a slight decrease in consumption was registered between 1985 and 2001, individual demand dropping from around 10.8 FME/year to 8.33 FME/year. This decrease is due mainly to the decrease in the consumption of concentrated milk at the national level and of whey (Leben) in rural areas (Directorate for Statistics, 2005). Concentrated milk is tending to disappear from the eating habits of Moroccan consumers, whereas whey is being sold more and more to street traders, who supply the traditional dairies (Mahlabates) in towns and cities.

**Table 3 - Milk derivative consumption trend (in litres of fresh milk equivalent)**

Commodity	1985			2001		
	Urban	Rural	Total	Urban	Rural	Total
<b>Fresh milk:</b>	27.74	9.82	17.58	36.83	13.71	26.62
unprocessed milk	2.99	8.94	6.73	5.35	11.24	7.94
pasteurised milk	24.75	0.88	11.21	31.48	2.47	18.68
<b>Derivatives:</b>	12.03	9.78	10.76	11.46	4.36	8.33
whey	2.9	7.02	5.24	3.18	2.83	3.02
yoghurts (cartons)	n.d.	n.d.	9	n.d.	n.d.	19
Raibi (cartons)	n.d.	n.d.	2,5	n.d.	n.d.	7
Other	9.13	2.76	5.52	8.28	1.53	5.31
<b>Cheese</b>	3.68	0.64	1.92	4.78	0.28	2.8
<b>Total</b>	<b>43.45</b>	<b>20.24</b>	<b>30.26</b>	<b>53.07</b>	<b>18.35</b>	<b>37.75</b>

Source: Directorate for Animal Husbandry (2006); Directorate for Statistics (2006).  
n.d.: no data available

In addition, it is interesting to note the increase in the consumption of yoghurts and raibis at the national level.<sup>4</sup> There has been a steady annual increase in the demand for this category of milk product of almost 4.8% (yoghurts) and 6.65% (raibis), from 9 cartons of yoghurt and 2.5 cartons of raibi in 1985 to 19 cartons and 7 cartons in 2001 respectively. This significant improvement is certainly due to the establishment of the large-scale retail trade in Morocco, the urbanisation of the population and the improvement of consumer incomes. According to the Ministry of Agriculture (2005), yoghurt and raibi consumption is increasing steadily, amounting to 23.5 and 9.5 cartons/person in 2004.

As regards cheese, an average annual increase in demand of 2.39% expressed in fresh milk equivalent was registered in the period from 1985 to 2001. The increase in urban consumption is reported to be the main cause – it rose from 1.92 to 2.8 FME/person/year, whereas rural demand dropped from 0.64 to 0.28 FME/person/year.

## Consumption projections

In a nutritionist scenario where the consumption of 90 litres of milk per person per year is advocated, projections concerning the consumption of milk and milk products should attain 3.6 billion litres for a population of 40 million by 2020. The average annual growth rate in the demand for these products would thus be 6.5% between 2006 and 2020 (Ministry of Agriculture, 2005). Since current national output is around 1.4 billion litres, the opportunities for developing the industry should place emphasis on improving production technology. Action should focus in particular on adopting genetic material that is efficient for milk production and on improving animal husbandry systems.

## Legislation and regulations governing milk products and derivatives

Quality management in the milk industry is one of the main concerns in the new milk plan launched by the Ministry of Agriculture in 2000. The development of consumer requirements (particularly in the urban environment) and the need to develop products in accordance with quality standards that have been recognized at the international level now impose rules concerning good practices throughout the various stages in the production chain. The adoption of these standards is the result of several phenomena including the regulatory environment, the level of quality perception of economic operators, and the progress made in the field of product traceability.

---

<sup>4</sup> - According to El Fellah (2005), "Raibi is a fermented milk which has been churned after inoculation with thermophile lactic bacteria alone or combined with other active germs to which authorised colouring and flavouring agents have been added."



## Regulatory instruments and bodies

The production and marketing of milk products in Morocco is governed by two types of regulatory instrument. There are specific instruments which directly concern the production chain, laying down the conditions for producing and marketing milk foods. This is the case with Decree no. 2-00-425 of 7 December 2000, which defines milk products and governs hygiene practices concerning the production, collection and transport of raw milk in accordance with Moroccan Standard (NM) 08.4.050. This instrument also determines the conditions for the manufacture, sale and distribution of milk and milk products in accordance with NM 08.4.052 on fermented milks (Ministry of Agriculture, 2003).

Furthermore, there are general texts which are horizontal in nature, governing food-stuffs in general, including milk products. These instruments determine in particular shelf life and transport and storage conditions and lay down the requirements for the labelling and presentation of milk products.

It must be pointed out that a number of bodies, most of which are under the authority of the departments of the Ministries of Agriculture, Industry and Trade, the Interior and Public Health, are involved in the application of these instruments. The main bodies directly concerned by questions of standardisation, certification and quality control are the veterinary departments attached to the Ministry of Agriculture and the Moroccan Industrial Standardisation Department (SNIMA), which is part of the Ministry of Industry and Trade.

## Quality control and management systems

A distinction must be made between two main stages in quality management in the milk industry – the raw milk stage and the processed milk stage. It is difficult, however, to establish general application of the standards for each type of product, due to:

- the fact that activity in the informal sector virtually falls outside the scope of most of the controls for which provision is made in the regulatory system;
- the fact that processing operators compete for the raw material, which sometimes comes from the same region and supplies several milk product processing plants;
- the weakness of consumer organisation and non-governmental structures defending consumer interests.

For this reason, investigations carried out in the field have focused more on normative aspects, with the result that the adoption of quality standards in the industry is still in the initial stages and efforts need to be made by all operators to apply these new concepts.

### *The case of collected raw milk*

Despite the farm monitoring advocated in the 1975 milk plan, information on dairy herd management is rather limited. The reasons cited are connected with the fact that on-farm milk testing and milk output recording is less frequent, which means that the extension authorities are denied precious information on productivity and product quality (Srairi, 2004). The fact that agriculture as a whole enjoys tax exemption is also a handicap for the collection of this data, since farmers are not required to make any declaration on their activity.

As a result, raw milk quality issues are dealt with mainly in the transactions between the collection centres and processors concerning the supply of this commodity.

Taken as a whole, the quality of raw milk produced in Morocco is a matter of concern for informed consumers, since contagious cattle diseases such as tuberculosis and brucellosis are not completely under control and compound the udder infection problems recorded on farms. Similarly, the conditions in which animals are housed affect hygiene in cowsheds. Cows are milked by hand in most cases – only 28% of farmers use milking machines. After milking, most producers store the milk at room temperature in unsuitable premises before selling it to the collection centres. All of these constraints together mean that possibilities of contamination cannot be limited and the physico-chemical and microbiological quality of the milk produced is consequently affected.

The milk testing carried out in the some 1,000 collection centres, all of which are equipped with refrigeration plant, consists in most cases of measuring milk density in addition to a perfunctory evaluation of acidity. This type of testing is inadequate for effectively detecting fraud in the form of watering down or skimming. However, in order to encourage farmers to deliver quality milk some collection centres have introduced a quality bonus system with their clients (processing plants and cooperatives). It is mainly large-scale farmers who benefit from this bonus, however, since they have well-equipped cowsheds and proper transport facilities.

The milk collected by the centres is then transferred to the processing plants. According to El Aabdouni (2005), various studies on the quality of this milk in terms of hygiene show that there has been no appreciable improvement since the 1970s. When the milk arrives at the processing plant in the tanker trucks it has a very high microorganism content with levels exceeding the microbiological standards for milk intended for human consumption. The product is then degassed and filtered in order to eliminate impurities before being stored in refrigerated tanks pending the processing procedures.

### *The case of processed milk*

A number of milk quality tests are carried out in the processing plants including acidity level, microbiological charge, density and fat content. The minimum requirement

is normally that the results of these tests must meet the values laid down in Standard NM 08.4.050 on good hygiene practices for the production, collection and transport of raw milk, which all collection centres are required to comply with. The overall appreciation of quality at this level plays an important role in the destination of the milk to be processed. It must be noted, however, that due to the mediocre microbiological quality of raw milk in Morocco the processes for manufacturing pasteurised and long-life milk (UHT milk, sterilised milk, powdered milk) generally require fairly costly heat treatment (El Aabdouni, 2005). The problem is more frequent during the summer period when milk storage life is shorter.

What is more, the milk processing establishments which treat the milk have to meet the conditions stipulated by Moroccan Standard NM 08.0.000 on the general principles of food hygiene. They must also set up a system of self-administered controls in accordance with Standard NM 08.0.002 on the guidelines for applying the HACCP (Hazard Analysis Critical Control Point) of the Codex Alimentarius. In the case of all products manufactured with fermented milk, the Standard NM 08.4.052 determines the authorised components and food additives (Ministry of Agriculture, 2003). It must be underlined, however, that processing plant conformity with quality requirements varies widely. This variability concerns both the formalisation and the application of these requirements. It depends primarily on the level of commitment of the persons responsible for quality management in the process of certification of the products manufactured.

## **Traceability in the food chain**

The quality management systems require that product traceability rules be laid down as advocated by the Technical Committee on Traceability in Morocco. In the case of milk, the national market is marked by certain difficulties in the application of these rules, particularly in the downstream industries following the processing phase. For the activity in the informal raw milk marketing channels, the disorganisation of these channels and the low level of small-producer organisation constitute the main obstacles to compliance with the statutory requirements concerning the identification of the raw material. As a result, the information essential to food product safety cannot be managed satisfactorily.

Furthermore, the operating methods of the collection centres also make it difficult to determine the origin and quality of the milk collected. Each centre supplies the processing plants with batches composed of raw material from various farms, and the only way to identify the possible origin of quality problems is to make a distinction between milk collected in the morning and milk collected in the afternoon. It must be pointed out, however, that these two batches of milk are sometimes mixed, particularly in periods of low lactation, and this can further complicate raw material identification.

Traceability problems can persist in processing plants, since the trucks deliver raw milk which generally consists of a mixture of batches from several collection centres (El Fellah, 2005). This is due in general to the limited storage capacities of the centres

compared to the carrying capacities of the means of transport used. The processing plants are then called upon also to plan in terms of milk received in the morning, milk received in the afternoon, or milk received throughout the day.

With regard to imported raw material and additives that have been added, the traceability approach takes account of the purchasing conditions agreed between the processing plants and their suppliers. It also has to be related to the method employed for managing stocks and the levels of inputs incorporated in the final product.

In the case of finished milk derivatives, one of the main traceability components is the information contained in the labelling. In this context, Decree no. 2-01-1016 of 4 June 2002 regulating foodstuff labelling and presentation conditions stipulates that the packaging must contain the following compulsory information *inter alia* (Ministry of Agriculture, 2003):

- the trade description
- the list of ingredients
- the net quantity
- the expiry date, any particular storage conditions and the production date
- the name or business name and address of the manufacturer or packer or importer
- the place of origin whenever the omission of that information could be confusing for the purchaser...

Part or all of this information normally applies to all milk products, the objective being to enable consumers to properly identify the characteristics of each product.

## Structure of the milk industry

The agro-industrial infrastructure in the milk sector is composed of some 50 processing plants. There are almost 20 private companies, which can have one or several plants in various regions of the country. The remainder is composed of cooperatives of various sizes and about 15 mini-dairies established in enclaves thanks to state subsidies. In the period from 2000 to 2004, these plants together processed an average of 60% of national milk output (Table 4). Street trading channels and own consumption including feed for calves thus continue to account for a significant share of output. The processing share was only 46% in the period from 1980 to 1989, a fact which illustrates the extent of the development of industrial processing infrastructures in the last 20 years.

Pasteurised milk absorbs almost two-thirds of the quantity of milk processed. Despite the increase in output since the beginning of the 1980s, the share of this product has been steadily decreasing to the advantage of milk derivatives (yoghurt, raibi, UHT milk, etc.), for which consumer demand is steadily growing.

**Table 4 - Evolution of the share of processed milk (million litres)**

Year / period	Output million litres	Processed milk		Pasteurised milk	
		Quantity	% output	Quantity	Processed milk
1980-1989	599	275	45.9	233	84.8
1990-1999	910	495	54.4	412	83.1
2000	1,150	710	61.7	520	73.2
2001	1,100	675	61.4	445	65.9
2002	1,200	700	58.3	460	65.7
2003	1,250	720	57.6	475	66.0
2004	1,370	820	59.9	520	63.4
2000-2004	1,214	725	59.7	484	66.8

Source: Directorate for Animal Husbandry (2006).

## Economic performance

The milk processing industry is one of the main branches of the agro-food sector in Morocco. Its economic performance has improved considerably over the last 10 years with investments tripling between 1998 and 2004, increasing from almost 202 million dh to 615 million dh (Table 5).

**Table 5 - Structure and performance of the milk industry**

Year	Number of establishments	Investments (1,000 dh)	Output value (1,000 dh)	Export value (1,000 dh)	Value added (1,000 dh)	Permanent job	Seasonal jobs
1998	49	201,933	4,477,220	176,595	1,058,974	4,743	2,750
1999	55	235,589	5,550,139	337,424	1,290,417	5,945	935
2000	63	376,468	5,747,337	538,576	1,400,334	6,376	1,251
2001	61	295,475	5,926,240	490,140	1,567,361	8,699	210
2002	55	325,737	6,563,746	517,092	1,789,521	8,823	1,288
2003	59	464,519	7,273,392	711,557	1,970,181	8,168	412
2004	65	615,209	7,732,565	579,474	1,949,304	8,552	2,610

Source: Ministry of Industry and Trade (2006).

At the same time, the value of gross output increased by almost 4.5 to over 7.7 billion dh, whereas the value added of the sector was estimated at almost 2 billion dh in 2004. Direct employment concerned almost 8,600 people in permanent jobs the same year. Seasonal employment provided jobs for almost 2,600 people, who were recruited according to the needs of the various production units. Exports amounted to around 650 million dh, mainly in the form of powdered milk products.

The structure of the industrial processing market for milk is relatively oligopolistic. With its five production units (Table 6), the Maroc Lait milk processing plant (CLML), which is a subsidiary of the Omnium Nord Africain holding and Danone, accounts for almost 60% of the quantities marketed. This figure reflects a fairly high degree of concentration, which is resulting in a low level of competition in the sector (Duval, 2004; ONA 2006). The rest of the market is divided between other private companies, dairy cooperatives and mini-dairies.

In addition to the CLML, the main private processing plants include Sialim in Tangiers, which is a subsidiary of the Bel group, Sais Lait in Fez and Nestlé in El Jadida. On the cooperative side, Bonlait in Marrakech, which produces the Yoplait brand of products, Colainord in Tétouan, Extralait in Kénitra, and Copag (Jaouda products) in the Agadir region have the largest production capacities. The production capacity utilisation rate varies from one plant to another but also according to the high and low lactation periods. The principle constraints in the industrial processing of milk are related essentially to raw material supply problems. The irregularity of production, the unfair competition presented by street trading channels, and the inadequacy of plant connected with the cold storage chain upstream are all factors which adversely affect the performances recorded. Other fears are currently expressed with regard to the possible increase in imports in the context of the free trade agreements with partner countries (EU, US, Arab countries, etc.), concentrated milk and powdered milk being the products mainly concerned.

**Table 6 - Main milk-processing plants**

Plant	Capacity litres/ day	Location
<b>Private sector</b>		
CLML (Danone)	1,100,000	Casablanca, El Jadida, Meknès, Salé, Tadla
Sialim	220,000	Tanger
Sais Lait	80,000	Fez
Nestlé	60,000	El Jadida
Halib Souss	60,000	Agadir
<b>Cooperatives</b>		
Bonlait	400,000	Marrakech
Extralait	200,000	Kénitra
Colainord	200,000	Tétouan
Copag	100,000	Agadir
Superlait	100,000	Casablanca

Source: Directorate for Animal Husbandry (2006).

## Agro-industrial and business strategies in the quality field

The problems connected with the raw material and the new consumer requirements concerning quality and milk product diversification require that processing plants develop a more integral vision of their production and marketing strategies.

The strategy of the major processing plants regarding the subsectors prior to processing is geared to developing partnership relations with suppliers with a view to resolving quality problems. These plants thus take action to provide training for farmers through abundant technical extension and advisory activities. The technique of granting the best raw material batches a quality bonus also acts as an incentive and encourages a spirit of competition amongst farmers, who are anxious to produce quality milk. Other means are also used at milk collection centre level in the form of aid for the purchase and repair of the equipment needed for storing raw milk before delivering it to the processing plants. This type of inter-trade coordination remains limited to the local level, however, and does not involve concerted efforts which might lead to actual full-scale agreements between the various operators in the production chain.

The plants which dominate the market at the processing stage, whether private companies or organised as cooperatives, have effected considerable investments in order to develop and maintain their leader brands. Promotional measures are constantly taken at consumer level to promote these brands, whose commercial image is directly reflected on various market segments, with a view to differentiating them from rival products. This action is perceptible mainly in the yoghurt and processed cheese sector through the content of TV and other commercials produced by advertisers.

In addition, more and more new products are being developed through horizontal differentiation that are nevertheless geared to consumers' incomes. These products are often given trade names evoking quality while remaining intelligible for all categories of consumers. This is the case for example with the 'Moufid' yoghurt (meaning 'beneficial') produced by the CLML or the 'Crémy' (= creamy) yoghurt produced by Copag, both of which are offered in a variety of flavourings. These products are now well-known and are sold at prices that are accessible for the average consumer in thousands of local sales outlets and in stores in the large-scale retail trade.

Other market segmentation strategies are pursued through the production of a range of low-fat milk products that are sold under telling names. This is the case with certain fruit yoghurts which have a very low sugar and fat content such as 'Yawmy' ('everyday') produced by the CLML and the Chergui brand range of yoghurt drinks and milk fruit juices. These products are considered dietary foods and generally target consumers who are health-conscious and anxious to keep fit (aware of diabetes, cholesterol problems, obesity, etc.). It must be pointed out, however that apart from the information concerning the chemical and nutritional composition of foodstuffs, there are as yet no regulations on the terms "light" or "health food" in Morocco (Clair, 2006).

All of this action to develop products is generally accompanied by the adoption of quality management systems, particularly by the larger processing plants. For in addition to the requirements connected with the HACCP standards advocated in the regulations in force, most of these plants are involved in ISO (International Standards Organisation) type systems for the certification of their products. This commercial certification complements sanitary quality requirements, depending on the more or less stringent versions adopted by managers.

## Structure of milk product marketing channels

There are two main types of marketing channels involved in delivering milk and milk products from the farm to the consumer. The first is known as street trading and is based on the informal activity of traders who collect the milk from farmers and sell it in urban centres. The second channel is referred to as the organised channel and involves industrial collection centres and production plants (Chart 2).

### Street trading channels

The street trading channel is based on the sale of milk by self-employed traders who collect it from the farms. These traders are equipped with means of transport of varying efficiency which are adapted to their function (motor bikes, vans) and travel throughout the rural areas surrounding urban centres, collecting the milk from the farmers. They then sell the milk they have collected to traditional dairies, cafés and urban households. The extent of their activities depends on the season (high and low lactation periods), but in general there are no gaps for at least two reasons. The first is that small farmers prefer to sell their milk to these traders, who guarantee that the product is paid for at the actual moment of sale. The second reason is related to the guarantee that the milk collected will be sold to dairies and households, particularly in working-class districts. The traditional dairies ('Mahlabates') can consume large quantities, using street-traded milk to prepare a variety of products – fruit juices mixed with milk, yoghurts and whey.

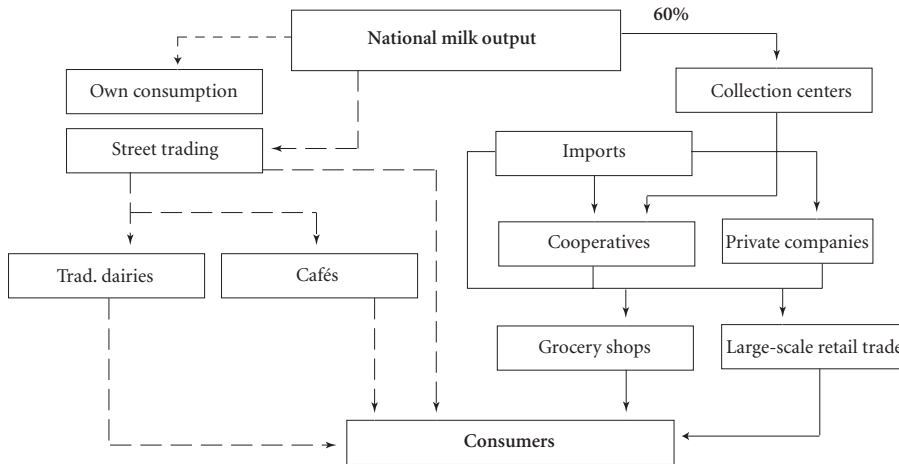
In addition to the fact that this milk is generally less expensive than pasteurised milk (4 or 5 dl/litre compared to 6 dl), the households and traditional dairies supplied by these street traders are very partial to the milk's organoleptic qualities compared to industrial milk (Ait El Mekki & al, 2002). It must be pointed out, however, that the milk that is marketed by street traders is not subject to any microbiological quality testing whatsoever. This problem is all the more worrying when one considers that the share of informally marketed milk can sometimes amount to 30% of the total quantities of milk consumed in certain towns and cities.

### Organised channels

In the organised marketing channels the collection centres play a crucial role in adding value to the milk for the benefit of farmers. The 1975 milk plan and the measures taken



**Chart 2 - Milk and milk product marketing channels in Morocco**



by the private sector have contributed considerably to the development of these centers in the main production areas, and this in turn has strengthened the commercial role they play in relations with production plants. Once the milk or milk products are ready for sale to consumers, these plants can choose between traditional or modern distribution channels for delivering the products to the targeted sales outlets. They can also pursue strategies in their choice of channels to be supplied, depending on spatial, seasonal and competitive parameters.

**Traditional and modern distribution**

The traditional distribution of food products is based on local trading. The Ministry of Trade and Industry estimates that in 2002 this type of trade accounted for almost 94% of the market. This share is currently around 91% as the result of the activity of shopkeepers operating in almost 760,000 sales outlets.

Supplying local shops with milk products from organised channels is part of the distribution system adopted by processing plants. Almost all of these plants use their own means of transport to deliver the products to the sales outlets. Where these outlets are at some distance from the industrial production sites, the plants have storage premises equipped with the appropriate plant for product preservation. Products which are not sold before their expiry date are even taken back from the sellers by the commercial salesmen of the various private companies and cooperatives, the aim being to enable local shopkeepers to obtain maximum supply of the various brands of products while at the same time being covered against the risk of poor sales.

The modern distribution network involves marketing channels which are part of the activities of chain stores. The large-scale retail trade is steadily expanding in Morocco

with just under 500 sales outlets including mini-markets, about 30 supermarkets and some 20 hypermarkets (Anonymous, 2006). These stores have been setting up business at a steady pace since the year 2000 with increasing presence in the working-class districts of large cities. The main retail chains operating in Morocco are Marjane of the ONA, Acima, which is allied with Auchan, Label'Vie of the Hyper S. A. company, Aswak Assalam and Makro, which is allied with Métro. Milk products are presented in these stores in refrigerated shelves on which a wide range of products is accessible in a self-service setup. The largest industrial plants manufacturing milk and milk products supply practically all of the big stores operating in Morocco.

### *Choice of distribution channels*

The strategy pursued by the industrial plants manufacturing milk and milk products in their choice of marketing channels can be described as non-selective. For these plants seem to be just as interested in local distribution as they are in the large-scale retail trade, given the objective of maximising sales volumes. This is also reflected in the homogenisation of business practices concerning sales transactions with both types of client. It is mainly a question of helping to define periodical milk product needs in consultation with the client concerned (local grocer or chain store), organising the supply operation, and taking back products which have not been sold by the expiry date.

However, much larger volumes can be absorbed by the chain stores in one single transaction than those ordered by one or several traditional sales outlets. In this case, the processing plant would tend to prefer transactions with the former clients in order to avoid transaction costs and to take advantage of economies of scale. However, the largest share of the milk products sold continues to be marketed through local traders. As with all food products, this type of trade has several advantages over the large-scale retail trade: the fact that it is widespread in rural areas, the flexibility of hire purchase, and the contact between the shopkeeper and the customer.

### *Internationalisation of distribution*

In Morocco, the distribution of milk products in the organised channels is geared essentially to the local market. Exports concern relatively small volumes of specific products dominated by powdered milk produced by Nestlé, which is established in the El Jadida region. The internationalisation of distribution is thus only conceivable if international chains have a share in the capital and, in particular, participate in the activity of the Moroccan distribution chains (as is the case with Auchan and Métro). For through these alliance strategies the national chain stores benefit from their multinational partners' business know-how. Aisle-end display management, product presentation on the shelves, product tasting and

special promotional offers launched inside stores are bound to be influenced by the commercial practices adopted by these multinationals.

## Conclusions and proposals for action

The milk industry is one of the main components of the agro-food system in Morocco. In addition to its socio-economic importance, it is of special interest in the nutritional field due to the range of milk products intended for human consumption.

As the Moroccan economy has opened up to the international market and the need to meet new consumer requirements has grown, the quality issue has become crucial throughout the industry. Concepts concerning norms and standards, product traceability and even certification are now gradually becoming vital for economic operators and more specifically for raw material producers and processors. The milk industry faces a number of constraints, however, which are impeding the efforts made by these operators to modernise milk product production and marketing processes. These constraints concern the activity of the informal sector, which is based on street trading, the absence of any effective cold storage chain in view of the inadequacy of storage facilities in the subsectors prior to processing, and the absence of an efficient inter-trade organisation. At the same time, the profession is expressing fears of the effects of the dismantling of tariffs on imported foreign products whose quality is certified (in particular powdered milk and concentrated milk for household and industrial use).

In order to mitigate the effect of these constraints and enable the milk industry to modernise its foothold in the world economy, the operators (including the Moroccan government) will have to make the quality concept the focus of their mutual interest. To do so, certain measures deserve greater commitment if they are to be applied within the regulatory framework governing quality requirements:

- the application of rules concerning good practices at the primary production stage by means of more elaborate extension services for farmers provided through local agricultural development structures,
- measures to improve animal husbandry and milk collection conditions by facilitating the conditions for awarding the incentives that are granted, particularly by the Agricultural Development Fund,
- measures to strengthen the system of payment for the quality of the raw material by granting more incentives to farmers within the framework of an efficient inter-trade organisation,
- action to strengthen the regulatory framework with a view to identifying and organising the activity of street traders and orienting it more towards supplying milk collection centres,
- action to tighten up the regulations governing the activity of traditional dairies by imposing traceability rules which they must comply with in order to combat the informal sector,

- measures to grant incentives to small cooperatives and mini-dairies in general with a view to improving their milk product standardisation systems, particularly in production enclaves.

The operators in the industry will have to take all of these measures by applying the concept of quality management; such management can only strengthen the socio-economic role played by the industry through integrative action that is more in line with the normative system in force.



# BIBLIOGRAPHY

## 1 THE FOUNDATIONS of food safety

### CHAPTER 1

Allaire (G.), "Quality in Economics, a Cognitive Perspective", in M. Harvey, A. McMeekin and A. Warde (eds), *Theoretical Approachs to Food Quality*, Manchester, Manchester University Press, 2003.

Apfelbaum (M.), *Risques et peurs alimentaires*, Paris, Odile Jacob, 1998.

Bouton (O.), *Management de la sécurité des aliments: de l'HACCP à l'ISO 22000*, Afnor, 2006.

Braun (J. von), *The World Food Situation*, Washington (D. C.), IFPRI, 2006.

Callon (M.), Lascoumes (P.) and Barthes (Y.), *Agir dans un monde incertain. Essai sur la démocratie technique*, Paris, Seuil, 2001.

Carr (E. R.), "Postmodern Conceptualizations, Modernist Applications: Rethinking the Role of Society in Food Security", *Food Policy*, 31 (1), 2006, p. 14-29.

Cazes-Valette (G.), "Le comportement du consommateur décodé par l'anthropologie. Le cas des crises de la vache folle", *Revue française de marketing*, 183-184 (3-4), 2001, p. 99-115.

Cochoy (F.), "Les effets d'un trop-plein de traçabilité", *La Recherche*, 339, 2001, p. 66-68.

Conseil national de l'alimentation, *Avis sur la traçabilité des denrées alimentaires*, Paris, June 28<sup>th</sup> 2001.

Codron (J. M.), Sirieix (L.) and Reardon (T.), "Social and Environmental Attributes of Food Products in an Emerging Mass Market: Challenges of Signaling and Consumer Perception, with European Illustration", *Agriculture and Human Values*, 23 (2), Summer 2006.

Crespi (J. M.) and Marette (S.), "How Should Food Safety Certification Be Financed?", *American Journal of Agricultural Economics*, 83 (4), November 2001, p. 852-861.

De Haen (H.) (ed.), *L'État de l'insécurité alimentaire dans le monde*, Rome, FAO, 2005.

Dekhili (S.), *Contribution des politiques de sécurité alimentaire au bien-être des populations: le cas de la Tunisie*, mémoire de recherche, DEA EGDAAR, Montpellier, Université Montpellier-I, Agro. M, 2004.

Delpeuch (F.), Le Bihan (G.) and Maire (B.), "Les malnutritions dans le monde: de la sous-alimentation à l'obésité", in G. Ghersi (ed.), *Nourrir 9 milliards d'hommes*, Paris, ADPF, 2005, p. 32-37.

Demirbas (N.) and Tosun (D.), "Restrictions of the Agricultural Sector on Safety and Quality Food Production in Turkey and Some precautions", *New Medit*, Bari, CIHEAM, 2, 2006, p. 20-24.

- Duchin (F.), "Sustainable Consumption of Food", *Rensselaer Working Papers in Economics*, n° 0405, New York (N. Y.), Troy, 2004.
- El Mekki (A.), Ghersi (G.), Hamimaz (R.) and Rastoin (J. L.), *Prospective agroalimentaire Maroc – 2010*, Casablanca, Fondation ONA, 2002.
- Elmi (M.), "Food Safety: Current Situation, Unaddressed Issues and the Emerging Priorities", *Eastern Mediterranean Health Journal*, 10 (6), Geneva, WHO, November 2004, p. 794-800.
- European Parliament, "Règlement CE N° 178 / 2002 du Parlement européen et du Conseil du 28 janvier 2002, établissant les principes généraux et les prescriptions générales de la législation alimentaire, instituant l'Autorité européenne de sécurité des aliments et fixant des procédures relatives à la sécurité des denrées alimentaires", *JOCE*, February 1<sup>st</sup> 2002.
- FAO, *Comprendre le Codex alimentarius*, Rome, WHO / FAO, 2005.
- Feuillet (P.), *Le Bon Vivant. Une alimentation sans peur et sans reproche*, Paris, INRA Éditions, 2002, 286 p.
- Fischler (C.), "La peur est dans l'assiette", *Revue française de marketing*, 183-184 (3-4), 2001, p. 7-10.
- Flores (M.), Khwaja (Y.) and White (P.), "Food Security in Protracted Crises: Building More Effective Policy Frameworks", *Disaster*, 29 (1), 2005, Odi: S25.
- Frenzen (P.), *Economics of Foodborne Diseases*, Washington (D. C.), USDA, ERS, 2004.
- Gallen (C.), "Le besoin de réassurance en consommation alimentaire", *Revue française de marketing*, 183-184 (3-4), 2001, p. 67-86.
- Giraud (G.), "Consumers and Food Traceability, a Comparison between European and North-American Recent Literature Review", USDA and AIEA2 International meeting, *Competitiveness in Agriculture and the Food Industry: US and EU Perspectives*, Bologna, University of Bologna, Department of Statistics, June 15<sup>th</sup> and 16<sup>th</sup> 2006.
- Godard (O.), *L'Ambivalence de la précaution, le principe de précaution dans la conduite des affaires humaines*, Paris, Éditions de la MSH and INRA, 2000.
- Grosclaude (J.) (ed.), *Sécurité et risques alimentaires. Problèmes politiques et sociaux, dossiers d'actualité*, Paris, La Documentation française, 2001, 177 p.
- Guillon (F.), "Sécurité alimentaire: quelle gestion des risques et des crises?", *Déméter 2001 – Économie et stratégies agricoles*, 2001, p. 15-71.
- Hamimaz (R.), "État et stratégies de fraudes au Maroc, l'exemple de la meunerie industrielle", *Revue Tiers-Monde*, 36 (344), 1995.
- Hawkes (C.) and Ruel (M. T.), *Understanding the Link between Agriculture and Health, 2020 Vision*, Washington (D. C.), IFPRI, Focus 13, 2006.
- Heidues (F.), Atsain (A.), Padilla (M.), Ghersi (G.), Nyangito (H.) and Le Vallée (J. C.), "Assessing Development Strategies and Africa's Food and Nutrition Security", proceedings of the International Conference *Assuring Food and Nutrition Security in Africa by 2020*, Washington (D. C.), IFPRI, 2004.
- Huffman (S.) and Jensen (H.), "Do Food Assistance Programs Improve Household Food Security? Recent Evidence from the United States", *Working Paper 03-WP-335*, Ames (Iowa), Center for Agricultural and Rural development, Iowa State University, 2003.



- Hyman (G.), Larrea (C.) and Farrow (A.), “Methods, Results and Policy Implications of Poverty and Food Security Mapping Assessments”, *Food Policy*, 30, 2005, p. 453-460.
- ISO, *The ISO Survey-2004*, Geneva, ISO Central Secretariat, 2005.
- Khalidi (R.), *La Sécurité alimentaire des produits en Tunisie*, Tunis, Memo INRAT Tunis, 2006.
- Kinsey (J.), “Does Food Safety Conflict with Food Security? The Safe Consumption of Food”, *Working Paper 04-01*, St. Paul (Minn.), The Food Industry Center, University of Minnesota, 2004, 24 p.
- Kourilsky (Ph.) and Viney (G.), *Le Principe de précaution*, report to the Prime Minister, Paris, Odile Jacob-La Documentation française, 2000.
- Latour (B.), *Politique de la nature*, Paris, La Découverte, 1999.
- Laufer (R.), *L'Entreprise face aux risques majeurs: à propos de l'incertitude des normes sociales*, Paris, L'Harmattan, 1993.
- Lebeche (R.), *Problématique de la salubrité des aliments*, Alger, Working Paper, non published, 2006.
- Meade (B.), Rosen (S.) and Shapourt (S.) (eds), *Food Security Assessment, 2005*, Washington (D. C.), GFA-17, USDA-ERS, 2006, 58 p.
- Mendez (M. A.) and Popkin (B. M.), “Globalization, Urbanization and Nutritional Change in the Developing World”, *eJADE, Journal of Agricultural and Development Economics*, 1 (2), 2004, p. 220-241.
- Ministère de la Santé et des Solidarités, *Deuxième Programme national nutrition santé – 2006-2010: actions et mesures*, Paris, 2006.
- Mormont (M.) and Van Huylenbroeck (G.), *À la recherche de la qualité. Analyses socio-économiques sur les nouvelles filières agroalimentaires*, Liège, Synopsis-Éditions Ulg, 2001, 200 p.
- Paalberg (R.), *Governance and Food Security in an Age of Globalization*, Washington (D. C.), IFPRI, 2002.
- Padilla (M.) and Oberti (B.) (eds), *Alimentation et nourritures autour de la Méditerranée*, Paris and Montpellier, Éditions Kathala and CIHEAM, 2000.
- Rastoin (J. L.) and Vissac-Charles (V.), “Le groupe stratégique des PME de terroir”, *Revue internationale des PME*, 12 (1-2), 1999, p. 171-192.
- Rastoin (J. L.), “Vers un modèle agroalimentaire européen? Une lecture pérouxienne”, *Sociétal*, 48, 2005, p. 14-19.
- Sinclair (U.), *The Jungle*, New York (N. Y.), Doubleday, Page & Co, 1906; and *The Jungle*, Londres, Penguin, 1976, 416 p.
- Stevens (C.), Devereux (S.) and Kennan (J.), “International Trade, Livelihoods and Food Security in Developing Countries”, *IDS Working Paper 215*, Brighton, 2003.
- Temple (H.) (ed.), *Le Nouveau Droit alimentaire européen: précaution, traçabilité, sécurité*, September 23<sup>rd</sup> and 24<sup>th</sup> 2004, Montpellier, Agropolis, Faculté de pharmacie, CIRAD, Centre du droit de la consommation, Université Montpellier-I, vol. 1, 2005, 267 p.
- TraceNet, *Le Livre blanc de la traçabilité agroalimentaire*, Tracenews Info, 2006, 31 p.
- Unnevehr (L. J.) (ed.), *Food Safety in Food Security and Food Trade*, Washington (D. C.), IFPRI, IFPRI 2020 Focus, n° 10, 2003.

Vaillant (V.), De Valk (H.) and Baron (E.), *Morbidité et mortalité dues aux maladies infectieuses d'origine alimentaire en France*, Paris, AFSSA and InVS, 2004.

WHO, *WHO Global Strategy for Food Safety*, Geneva, 2002, 27 p.

Wilson (L.) and Otsuki (T.), "Balancing Risk Reduction and Benefits from Trade in Setting Standards", in L. J. Unnevehr (ed.), *Food Safety in Food Security and Food Trade*, Washington (D. C.), IFPRI, IFPRI 2020 Focus, n° 10, 2003.

Zhang (X.), "Chinese Consumers' Concerns About Food safety: Case of Tianjin", *Journal of International Food and Agribusiness Marketing*, 17 (1), 2005, p. 57-69.

Internet:

<http://epp.eurostat.cec.eu.int/>

<http://europa.eu/pol/food/>

<http://faostat.fao.org/>

[www.efsa.europa.eu/fr](http://www.efsa.europa.eu/fr).

[www.ers.usda.gov/Data/](http://www.ers.usda.gov/Data/)

[www.fao.org/es/esa/index\\_fr](http://www.fao.org/es/esa/index_fr).

[www.fao.org/faostat/foodsecurity/](http://www.fao.org/faostat/foodsecurity/)

[www.ifpri.org/](http://www.ifpri.org/)

[www.insee.fr/fr/](http://www.insee.fr/fr/)

[www.insee.fr/](http://www.insee.fr/)

[www.invs.sante.fr/](http://www.invs.sante.fr/)

[www.iso.org/iso/](http://www.iso.org/iso/)

[www.millenniumassessment.org/](http://www.millenniumassessment.org/)

[www.norme-iso22000.info/](http://www.norme-iso22000.info/)

[www.oecd.org/statsportal/](http://www.oecd.org/statsportal/)

[www.origin-gi.com/](http://www.origin-gi.com/)

[www.tracenet.fr/](http://www.tracenet.fr/)

[www.un.org/esa/population/unpop.htm](http://www.un.org/esa/population/unpop.htm)

[www.who.int/bmi/index.jsp](http://www.who.int/bmi/index.jsp)

[www.who.int/foodsafety/publications/general/global\\_strategy/en/](http://www.who.int/foodsafety/publications/general/global_strategy/en/)

[www.who.int/fr/](http://www.who.int/fr/)

[www.worldbank.org/](http://www.worldbank.org/)

[www.worldbank.org/data/](http://www.worldbank.org/data/)

[www.worldfoodsafety.org/](http://www.worldfoodsafety.org/)

[www.wto.org/indexfr.htm](http://www.wto.org/indexfr.htm)

[www3.who.int/whosis/core/core\\_select.cfm](http://www3.who.int/whosis/core/core_select.cfm)

## CHAPTER 2

Albisu (L. M.), "International Marketing in the Midst of Competition and Partnership", in D. Padberg, Ch. Ritson and L. M. Albisu (eds), *Agro-Food Marketing*, Wallingford, CAB International, 1997.

Albisu (L. M.) and Gracia (A.), "L'influence des systèmes de distribution sur le choix des consommateurs des produits alimentaires", in J. L. Rastoin (ed.), *Actes du colloque AIEA2-SFEA Mondialisation et géostratégies agroalimentaires*, Montpellier, ENSA-M/INRA, 1998, p. 261-270.



- Albisu (L. M.), Meza (L.) and Laajimi (A.), "Agro-Food Industries Competitiveness According to the Products Sold in the Market", *Medit*, 11 (2), 2001, p. 2-7.
- Albisu (L. M.) and Corcoran (K.), "Agro-Food Business Strategies for Origin Labelled Products", *Agrarwirtschaft*, 6 (8), 2001, p. 362-367.
- Becker (T.), Benner (E.) and Glitsch (K.), "Consumer Perception of Fresh Meat Quality in Germany", *British Food Journal*, 102, 2000, p. 246-266.
- Caswell (J.) and Mojdzuska (E. M.), "Using Informational Labelling to Influence the Market for Quality in Food Products", *American Journal of Agricultural Economics*, 78, 1996, p. 1248-1253.
- Davis (D. E.) and Stewart (H.), "Changing Consumer Demands Create Opportunities for U.S. Food System", *Food Review*, 56, 2002, p. 347-353.
- De Gaetano (M.), "Qualità e marketing nel settore agroalimentari", Forum Food Quality, II Forum Europeo sulla Qualità Alimentare, *Quaderno Qualivita*, 3, 2005.
- Delannoy (P.) and Hervieu (B.), *À table. Peut-on encore bien manger?*, La Tour d'Aigues, Éditions de l'Aube, 2003.
- Drichoutis (A. C.), Lazaridis (P.) and Nayga Jr. (R. M.), "Who is Looking for Nutritional Food Labels?", *EuroChoices*, 4 (1), 2005, p. 18-23.
- Ettabti (A.), "La perception de la qualité de la viande rouge fraîche par la ménagère marocaine", *New Medit*, 4 (3), 2005, p. 27-31.
- European Commission, direction générale Santé et Protection des Consommateurs, "Les attitudes des consommateurs à l'égard de l'étiquetage. Étude qualitative dans 28 pays européens", 2005.
- European Commission, *Eurobarometer. European Union Citizens and Agriculture from 1995 to 2003*, September 2004.
- Feliciano (D.) and Albisu (L. M.), "A New Ready-to-Eat Dish for a Traditional Market", *Journal of Food Service*, 17, 2006, p. 124-134.
- Forum Food Quality, I Forum Europeo sulla Qualità Alimentare, *Quaderno Qualivita*, 2, 2004.
- Forum Food Quality, II Forum Europeo sulla Qualità Alimentare, *Quaderno Qualivita*, 3, 2005.
- Gracia (A.) and Albisu (L. M.), "Moving Away from a Typical Mediterranean Diet: The Case of Spain", *British Food Journal*, 101 (9-10), 1999, p. 701-714.
- Gracia (A.) and Albisu (L. M.), "Food Consumption in the European Union: Main Determinants and Country Differences", *Agribusiness: An International Journal*, 17 (4), 2001, p. 469-488.
- Gracia (A.), Ekinci (S.) and Albisu (L. M.), "Consumers' Buying Decision Process for Nuts in Spain", *New Medit Journal*, 3, 2003, p. 22-27.
- Grunert (K. G.), Brunso (K.), Bredhal (L.) and Bech (A. C.), "Food-Related Lifestyle: A Segmentation Approach to European Food Consumers", in L. J. Frewer, E. Risvik, N. J. Schifferstein and R. von Alvensleben (eds), *Food, People and Society: A European Perspective of Consumers' Food Choices*, London, Springer Verlag, 2001.

Grunert (K.), "Future Trends and Consumer Lifestyles with Regard to Meat Consumption", *Meat Science*, 74, 2006, p. 149-160.

Kim (S.), Nayga Jr. (R. M.) and Capps Jr. (O.), "Food Label Use, Self-Selectivity and Diet Quality", *The Journal of Consumer Affairs*, 35 (2), 2001, p. 346-363.

Lusk (J. L.), Brown (J.), Mark (T.), Proseku (I.), Thompson (R.) and Welsh (J.), "Consumer Behavior, Public Policy, and Country-of-Origin Labelling", *Review of Agricultural Economics*, 28 (2), 2006, p. 284-292.

McEachern (M. G.) and Warnaby (G.), "Retail 'Quality Assurance' Labels as a Strategic Marketing Communication Mechanism for Fresh Meat", *International Review of Retail, Distribution and Consumer Research*, 1, 2004, p. 255-271.

Mtimet (N.) and Albisu (L. M.), "Spanish Wine Consumer Behavior: A Choice Experiment Approach", *Agribusiness: An International Journal*, 22 (3), 2006, p. 343-362.

Padilla (M.), Hamimaz (R.), El Dahr (H.), Zurayk (R.) and Moubarak (F.), "Consumers and the Health and Environmental Quality of Products", *Annual Report 2006. Agri. Med. Agriculture, Fisheries, Food and Sustainable Rural Development in the Mediterranean Region*, CIHEAM, 2006.

Papadopoulos (N.) and Heslop (L. A.), "Country Equity and Product-Country Images: State-of-the-Art in Research and Implications", in S. C. Jain (ed.), *Handbook of Research in International Marketing*, Northampton (Mass.), Edwar Elgar Publishing, 2003.

Petrovici (D. A.), Ritson (C.) and Ness (M.), "Exploring Disparities and Similarities in European Food Consumption Patterns", *Cahiers d'économie et sociologie rurales*, 75, 2005, p. 23-50.

Sanjuán (A. I.), Gracia (A.), Colom (A.) and Albisu (L. M.), *Los consumidores y los alimentos con Denominación de Origen y otros distintivos de calidad en Aragón, Cataluña, Navarra y La Rioja*, Gobierno de Aragón, 2006.

Sirieux (L.), "Confiance des consommateurs et choix de lieux d'achat de vin", *Revue française de marketing*, 183-184 (3-4), 2001, p. 115-126.

Vanhuele (M.) and Drèze (X.), "Measuring the Price Knowledge Shoppers Bring to the Store", *Journal of Marketing*, 66, 2002, p. 72-85.

Variyam (J. N.), *Nutrition Labelling in the Food-Away-from-Home Sector. An Economic Assessment*, Washington (D. C.), USDA, Economic Research Service, Economic Research Report n° 4, 2005.

Verrini (L.), "La qualità percepita dal consumatore: fattore di competitività", Forum Food Quality, I Forum Europeo sulla Qualità Alimentare, *Quaderno Qualivita*, 2, 2004, p. 44-46

### CHAPTER 3

Alfnes (F.) and Rickersten (K.), "European Consumers' Acceptance of US Hormone-Treated Beef", *EuroChoices*, 3 (3), 2004, p. 18-23.

Bredhal (L.), "Determinants of Consumer Attitudes and Purchase Intentions with Regard to Genetically Modified Foods – Results of a Cross-national Survey", *Journal of Consumer Policy*, 24, 2001, p. 23-61.

BSE Inquiry, *The Inquiry into BSE and Variant CJD in the United Kingdom: A Report in 16 Volumes*, Londres, HMSO, 2000 ([www.bseinquiry.gov.uk](http://www.bseinquiry.gov.uk)).

- Caswell (J.), "An Evaluation of Risk Analysis as Applied to Agricultural Biotechnology", *Agribusiness*, 16 (1), 2000, p. 115-123.
- Caswell (J.), "Labeling Policy for GMO's: To Each his Own", *AgBioForum*, 3 (1), p. 53-57 ([www.agbioforum.missouri.edu](http://www.agbioforum.missouri.edu)).
- Charlier (Ch.), "Traçabilité et gestion de la sécurité alimentaire. Quelle politique pour le règlement européen 178 / 2002?", *Économie rurale*, 282, 2004, p. 72-78.
- Commission of the European Communities, *White Paper on Food Safety*, Bruxelles, Commission of the European Communities, 2000.
- Drichoutis (A. C.), Lazaridis (P.) and Nayga Jr (R. M.), "Nutrition Knowledge and Consumer Use of Nutritional Food Labels", *European Review of Agricultural Economics*, 32 (1), 2005, p. 93-118.
- Enneking (U.), "Willingness to Pay for Safety Improvements in the German Meat Sector: The Case of the Q & S Label", *European Review of Agricultural Economics*, 31 (2), 2004, p. 205-224.
- Foulton (M.) and Giannakas (K.), "Inserting GM Products into the Food Chain: The Market and Welfare Effects of Different Labeling and Regulatory Regimes", *American Journal of Agricultural Economics*, 86 (1), 2004, p. 42-60.
- Garcia (M.) and Fearné (A.), "Is Co-Regulation More Efficient and Effective in Supplying Safer Food? Insights from the UK", paper presented at the American Agricultural Economics Association, pre-conference workshop: *New Food Safety, Incentives and Regulatory, Technological and Organizational Innovations*, Long Beach (Calif.), July 22<sup>nd</sup> 2006.
- Garcia (M.), Poole (N.), Skinner (C.), Illes (C.) and Lehota (J.), "Food Safety Performance in European Union Accession Countries: Benchmarking for Fresh Produce Import Sector in Hungary", *Agribusiness*, 22 (1), 2006, p. 79-90.
- Gellynck (X.), Verbeke (W.) and Vermeire (B.), "Pathways to Increase Consumer Trust in Meat as a Safe and Wholesome Food", *Meat Science*, 74, 2006, p. 161-171.
- Giannakas (K.) and Fulton (M. E.), "Consumption Effects of Genetic Modification: What if Consumers Are Right?", *Agricultural Economics*, 27, 2002, p. 97-109.
- Golan (E.), Krissoff (B.), Kuchler (F.), Calvin (L.), Nelson (K.) and Price (G.), *Traceability in the U.S. Food Supply: Economic Theory and Industry Studies* (Agricultural Economic Report n° 830), Washington (D. C.), USDA, Economic Research Service, 2004.
- Golan (E.), Roberts (T.), Salay (E.), Caswell (J.), Ollinger (M.) and Moore (D.), *Food Safety Innovations in the United States. Evidence from the Meat Industry* (Agricultural Economic Report n° AER831), Washington (D. C.), USDA, Economic Research Service, 2004.
- Grunert (K. G.), "Food Quality and Safety: Consumer Perception and Demand", *European Review of Agricultural Economics*, 32 (3), 2005, p. 369-392.
- Hobbs (J. E.) and Plunkett (M. D.), "Genetically Modified Foods: Consumer Issues and the Role of Information Asymmetry", *Canadian Journal of Agricultural Economics*, 47, 1999, p. 445-455.
- Howard (Ph. H.), "Central Coast Consumers Want More Food-Related Information, from Safety to Ethics", *California Agriculture*, 60 (1), 2006, p. 14-19.
- Hu (W.), Hünneimyer (A.), Veeman (M.) and Adamomowicz (W.), "Trading off Health,

Environmental and Genetic Modification Attributes in Food”, *European Review of Agricultural Economics*, 31 (3), 2004, p. 389-407.

Huffman (W. E.), Rousu (M.), Shogren (J. F) and Tegene (A.), “Who Do Consumers Trust for Information: The Case of Genetically Modified Foods?”, *American Journal of Agricultural Economics*, 86 (5), 2004, p. 1222-1229.

Hunt (S.) and Frewer (L.), “Trust in Source Information About Genetically Modified Food Risks in the U. K.”, *British Food Journal*, 103 (1), 2001, p. 46-62.

Joly (P.-B.) and Harris (C.), “Les Américains ont-ils accepté les OGM? Analyse comparée de la construction des OGM comme problème public en France et aux États-Unis”, *Cahiers d'économie et sociologie rurales*, 68-69, 2003, p. 11-47.

Lloyd (T. A.), McCorrstone (S. J.), Morgan (C. W.) and Rayner (A. J.), “Food Scares, Market Power and Price Transmission: The UK BSE Crisis”, *European Review of Agricultural Economics*, 33 (2), 2006, p. 119-148.

Loureiro (M. L.), Gracia (A.) and Nayga Jr. (R. M.), “Do Consumers Value Nutritional Labels?”, *European Review of Agricultural Economics*, 33 (2), 2006, p. 249-268.

Lusk (J. L.), House (L. O.), Valli (C.), Jaeger (S. R.), Moore (M.), Morrow (J. L.) and Traill (W. B.), “Effect of Information About Benefits of Biotechnology on Consumer Acceptance of Genetically Modified Food in the United States, England and France”, *European Review of Agricultural Economics*, 31 (2), 2004, p. 179-204.

Lusk (J. L.) and Coble (K. H.), “Risk Perceptions, Risk Preference, and Acceptance of Risky Food”, *American Journal of Agricultural Economics*, 87 (2), 2005, p. 393-405.

Mazzochi (M.), Lobb (A. E.) and Traill (W. B.), “Food Scares and Consumer Behaviour: A European Perspective”, paper presented at the International Association of Agricultural Economists Conference, Brisbane (Australie), August 12<sup>th</sup>-18<sup>th</sup> 2006.

Nayga Jr. (R. M.), Aiew (W.) and Nichols (J.), “Information Effects on Consumers’ Willingness to Purchase Irradiated Food Products”, *Review of Agricultural Economics*, 27 (1), 2005, p. 37-48.

Noussair (C.), Robin (S.) and Ruffieux (B.), “Do Consumers not Care about Biotech Foods or Do They just not Read the Labels?”, *Economic Letters*, 75, 2002, p. 47-53.

Ollinger (M.), Moore (D.) and Chandran (R.), *Meat and Poultry Plants’ Food Safety Investments: Survey Findings*, Washington (D. C.), USDA, Economic Research Service, 2004.

Peddie (S.), Stott (A.), Oglethorpe (D.) and Gunn (G.), “Communicating Food-Safety Risks to Key Stakeholders”, *EuroChoices*, 4 (2), 2005, p. 42-48.

Piggott (N. E.) and Marsh (Th. L.), “Does Food Safety Information Impact U.S. Meat Demand?”, *American Journal of Agricultural Economics*, 86 (1), 2004, p. 154-174.

Ritson (C.) and Mai (L. W.), “The Economics of Food Safety”, *Nutrition and Food Science*, 98 (5), 1998, p. 253-259.

Valeeva (N. I.), Meuwissen (M. P. M.), Bergevoet (R. H. M.), Lansik (A. G. J. M.) and Huirne (R. B. M.), “Improving Food Safety at the Dairy Farm Level: Farmers’ and Experts’ Perceptions”, *Review of Agricultural Economics*, 27 (4), 2005, p. 574-592.

## CHAPTER 4

Baourakis (G.), *Marketing Trends for Organic Food in the 21<sup>st</sup> Century*, Singapour, World Scientific Publishing Co. Pte. Ltd, 2004.

Burton (M.), Rigby (D.), Young (T.) and James (S.), "Consumer Attitudes to Genetically Modified Organisms in Food in the UK", *European Review of Agricultural Economics*, 28 (4), 2001, p. 479-498.

DOLPHINS, *Final Report of WP4 Link between Origin Labelled Products and Consumers and Citizens. Concerted Action Development of Origin Labelled Products: Humanity, Innovation and Sustainability*, edited by B. Sylvander, 2002.

European Commission, *Protection of Geographical Indications, Designations of Origin and Certificates of Specific Character for Agricultural Products and Foodstuffs*, Working Document of the Commission Services, August 2004a [2nd ed.] ([http://ec.europa.eu/agriculture/foodqual/quali1\\_en.htm](http://ec.europa.eu/agriculture/foodqual/quali1_en.htm)).

European Commission, *Special Eurobarometer on European Union citizens and agriculture from 1995 to 2003*, 2004b ([http://ec.europa.eu/public\\_opinion/archives\\_en.htm](http://ec.europa.eu/public_opinion/archives_en.htm)).

European Commission (<http://ec.europa.eu/agriculture/foodqual>), July 2006.

Fotopoulos (C.) and Krystallis (A.), "Are Quality Labels a Real Marketing Advantage? A Conjoint Application on Greek PDO Protected Olive Oil", *Journal of International Food and Agribusiness Marketing*, 12 (1), 2001, p. 1-22.

Grunert (S.) and Juhl (J. H.), "Values, Environmental Attitudes and Buying Organic Foods", *Journal of Economic Psychology*, 16, 1995, p. 62-69.

IDRHa, *Apresentação e análise de dados sobre produção, preços e comercialização 2004*, Lisbon, Direcção de serviços de planeamento, Divisao de estudos planeamento e prospectiva, 2006 ([www.idrha.min-agricultura.pt/produtos\\_tradicionais](http://www.idrha.min-agricultura.pt/produtos_tradicionais)).

IFOAM (International Federation of Organic Agriculture Movements), *The World of Organic Agriculture 2005*, 2005.

INAO, *Rapport d'activité 2004-2005*, 2006a ([www.inao.gov.fr/](http://www.inao.gov.fr/)).

INAO, *Fiche synoptique des AOC laitiers en 2003*, 2004, Syndicats d'appellation SECODIP, 2006b ([www.inao.gov.fr/](http://www.inao.gov.fr/)).

INAO, *Fiche synoptique des AOC agroalimentaires en 2004*, Syndicats d'appellation SECODIP, 2006c ([www.inao.gov.fr/](http://www.inao.gov.fr/)).

ISMEA, *I prodotti agroalimentari protetti in Italia. Le tendenze della produzione e del mercato e la situazione a livello comunitario*, 2005.

Kleijn (J.), Borgstein (A.), De Jager (M. D.) and Zimmermann (H. K. L.), "Enlarging the Market for Horticultural Organics in the Netherlands", *Acta Horticulturae*, 391, 1996, p. 143-151.

Lusk (J. L.), Roosen (J.) and Fox (J. A.), Demand for Beef from Cattle Administered Growth Hormones or Fed Genetically Modified Corn: A Comparison of Consumers in France, Germany, the United Kingdom and the United States", *American Journal of Agricultural Economics*, 81 (1), 2003, p. 16-29.

Lusk (J. L.), Brown (J.), Mark (T.), Proseku (I.), Thompson (R.) and Welsh (J.), "Consumer Behaviour, Public Policy, and Country-of-Origin Labelling", *Review of Agricultural Economics*, 28 (2), 2006, p. 284-292.

Lusk (J. L.), Jamal (M.), Kurlander (L.), Roucan (M.) and Taulman (L.), "A Meta Analysis of Genetically Modified Food Valuation Studies", *Journal of Agricultural and Resource Economics*, 30, 2005, p. 28-44.

MAPA, *Datos de las DOP/IGP. Años 2003 y 2004*, Subdirección General de Calidad y Promoción Agroalimentaria, 2006a ([www.mapya.es/](http://www.mapya.es/))

Michelsen (J.), Hamm (U.), Wynen (E.) and Roth (E.), "The European Market for Organic Products: Growth and Development", in *Organic Farming in Europe: Economics and Policy*, vol. VII, Stuttgart, University of Hohenheim, 1999.

Papadopoulos (N.) and Heslop (L. A.), *Product-Country Images: Impact and Role in International Marketing*, New York (N. Y.), The Haworth Press, 1993.

Philippidis (G.) and Sanjuán (A. I.), "Territorial Product Associations in Greece: The Case of Olive Oil", *Journal of International Food and Agribusiness Marketing*, 14 (1), 2002, p. 24-46.

Philippidis (G.) and Sanjuán (A. I.), "Territorial Food Product Perceptions in Greece and Spain: A Logit Modelling Approach", *Journal of Food Products Marketing*, 11 (4), 2005, p. 41-62.

Rohner-Thielen (E.), "Organic Farming in Europe", EUROSTAT, Statistics in Focus, Agriculture and Fisheries, 2005.

Sanjuán (A. I.), Gracia (A.), Colom (A.) and Albisu (L. M.), *Los consumidores y los alimentos con Denominación de Origen y otros distintivos de calidad en Aragón, Cataluña, Navarra y La Rioja*, Gobierno de Aragón, Departamento de Agricultura y Alimentación, 2006.

Sanjuán (A. I.), Sánchez (M.), Gil (J. M.), Gracia (A.) and Soler (F.), "Brakes to the Organic Market Enlargement in Spain: Consumers and Retailers Attitudes and Willingness to Pay", *International Journal of Consumer Studies*, 27 (2), 2003, p. 134-144.

Shimp (T. A.) and Sharma (S.), "Consumer Ethnocentrism: Construction and Validation of the CETSCALE", *Journal of Marketing Research*, 24, 1987, p. 280-289.

Skuras (D.) and Vakrou (A.), "Consumers' Willingness to Pay for Origin Labelled Wine: A Greek Case Study", *British Food Journal*, 104 (11), 2002, p. 989-912.

Tregear (A.), Kuznesof (S.) and Moxy (A.), "Policy Initiatives for Regional Foods, Some Insights from Consumer Research", *Food Policy*, 23 (5), 1998, p. 383-394.

Trognon (L.), "The Influences of Territorial Identity on Consumer Preferences: A Contribution Based on the RIPPLE Programme. Consumer Preferences for Products of Own Region/ Country and Consequences for Food Marketing", *AIR-CAT Workshop Proceedings*, 4 (3), April 1998.

TYPIC, *Final Project Report DL-16*, edited by Georges Giraud, 2005 ([www.typic.org/final\\_report.htm](http://www.typic.org/final_report.htm)).

Van der Lans (I. A.), Van Ittersum (K.), De Cicco (A.) and Loseby (M.), "The Role of the Region of Origin and EU Certificates of Origin in Consumer Evaluation of Food Products", *European Review of Agricultural Economics*, 28 (4), 2001, p. 451-477.

Van Ittersum (K.), "Consumer Ethnocentrism and Regional Involvement as Antecedents for Consumers' Preference for Products from the Own Region", *Proceedings of EU-AIR III Project "Food for the Consumer"*, 5 (1), 1999, p. 45-51.

Van Ittersum (K.), Canderl (M. J. J. M.) and Meulenerg (M. T. G.), "The Influence of the Image of a Product's Region of Origin on Product Evaluation", *Journal of Business Research*, 56 (3), 2003, p. 215-226.



Verlegh (P. W. J.) and Steenkamp (J. E. M.), “A Review and Meta-Analysis of Country of Origin Research”, *Journal of Economic Psychology*, 20, 1999, p. 521-546.

Wier (M.), Calverley (C.), “Market Potential for Organic Foods in Europe”, *British Food Journal*, 104 (1), 2002, p. 45-62.

## 2 THE QUALITY OF MEDITERRANEAN FOOD PRODUCTS

### the case of milk products and milk derivatives

#### CHAPTER 5

Bérard (L.) and Marchenay (P.), *Les Produits de terroir, entre cultures et règlements*, Paris, CNRS Éditions, 2004, 229 p.

Berriet-Sollec (M.), Daucé (P.), Léon (B.) and Schmitt (B.), “Vers un indicateur de croissance économique locale pour l'évaluation des politiques de développement rural”, *Revue d'économie régionale et urbaine*, 3, 2000, p. 415-440.

Béteille (R.), *La France du vide*, Paris, LITEC, coll. “Géographie économique et sociale”, 1981, 256 p.

Boisseaux (S.) and Stucki (E.), *About the Link Between Origin Labelled Products and Rural Development*, Action concertée “Development of Origin Labelled Products: Humanity, Innovation and Sustainability (DOLPHINS)”, 5<sup>th</sup> Framework Program EU, Florence, September 10<sup>th</sup>-12<sup>th</sup> 2001, 17 p.

Briand (H.), “L'impact sur le développement territorial de la politique d'AOC”, séminaire de l'EAAE, *Aspects socio-économiques de l'origine dans les filières agroalimentaires: territoires, coordination et institutions*, Le Mans, INRA, October 28<sup>th</sup>-30<sup>th</sup> 1999, 9 p.

Casabianca (F.), Sylvander (B.), Noël (Y.), Béranger (C.), Coulon (J.-B.) and Roncin (F.), “Terroir et Typicité, deux concepts clés des appellations d'origine contrôlée – Essai de définitions scientifiques et opérationnelles”, International Symposium PSDR, *Territoires et enjeux du développement régional*, Lyon, March 9<sup>th</sup>-11<sup>th</sup> 2005, 32 p.

Coutre-Picard (L.), “Impact économique des filières fromagères savoyardes”, *Purpan, études scientifiques, techniques, économiques, juridiques pour l'agriculture et le milieu rural*, 191, 1999, p. 135-153.

Couzinet (L.) and Frayssignes (J.), “Stratégie de marché et développement rural dans les filières de qualité. L'exemple d'Avigers et de Roquefort”, *Bulletin de la Société archéologique, historique, littéraire et scientifique du Gers*, Year CII<sup>nd</sup>, 3<sup>rd</sup> quarter 2002, p. 365-381.

Couzinet (L.) and Frayssignes (J.), “Filières sous signe officiel de qualité et développement territorial: quelles approches?”, in C. Margetic (ed.), *Dynamiques agro-industrielles et dynamiques rurales*, Arras, Artois Presses Université, coll. “Géographie”, 2004, p. 149-167.

Delfosse (C.), *La France fromagère*, thèse, Université Paris I-Panthéon Sorbonne, 2 vol., 1992.

Frayssignes (J.), “L'ancrage territorial d'une filière fromagère d'AOC: l'exemple du système Roquefort”, *Économie rurale*, 264-265, 2001, p. 89-103.

Frayssignes (J.), “L'ancrage territorial des filières agroalimentaires: le cas des AOC fromagères françaises”, INRA-INAO Seminar, *Produits laitiers*, Malbuisson, March 9<sup>th</sup> and 10<sup>th</sup> 2004, 8 p.

Frayssignes (J.), “Les signes officiels de qualité dans les dynamiques de développement territorial: étude géographique à partir des AOC fromagères françaises”, Conférence *Faire campagne – pratiques et projets des espaces ruraux aujourd’hui*, UMR ESO, CNRS, Université Rennes II, March 17<sup>th</sup> and 18<sup>th</sup> 2005, 19 p. (to be published).

Frayssignes (J.), *Les AOC dans le développement territorial. Une analyse en termes d’ancrage appliquée aux cas français des filières fromagères*, thèse, INP-ENSAT, 2005, 469 p. (2 vol.).

Frayssignes (J.), *Gis in Territorial Development, an Analysis in Terms of Anchoring, Applied to the French Cases of Cheese Supply Chains*, lecture to the SYNER-GI meeting (Strengthening International Research on Geographical Indications), Toulouse, January 12<sup>th</sup> and 13<sup>th</sup>, 2006, 7 p.

Gallagher (P.), *Trademarks or Colonialism? The Value of Geographical Indications*, Congrès mondial de la laiterie, Paris, September 24<sup>th</sup>-27<sup>th</sup> 2002, 15 p.

Guiraud (S.), “Roquefort, un avenir à affiner”, *Ressources*, 139, supplément au quotidien *Midi-Libre*, 1997, 4 p.

Lagrange (L.) (ed.), *Signes officiels de qualité et développement agricole*, Conférence SFER-INRA, ENITA, Clermont-Ferrand, April 14<sup>th</sup> and 15<sup>th</sup> 1999, 354 p.

Mollard (A.), “Qualité et développement territorial: un outil d’analyse théorique à partir de la rente”, *Économie rurale*, 261, 2001, p. 16-34.

Nefussi (J.), *Les Filières agroalimentaires: filières de produits ou de services?*, Paris, Armand Colin, coll. “Déméter, Économie et stratégies agricoles”, 2000, p. 9-70.

Olivier (V.) (ed.), *Signes officiels de qualité: comment évaluer leurs retombées socio-économiques territoriales? Une étude prospective dans la région Midi-Pyrénées*, Rapport intermédiaire, Programme de recherches pour et sur le développement régional en Midi-Pyrénées (Agriculture, IAA et Espaces ruraux), Dynamiques rurales (ENSAT, ENFA, UTM), 2003, 19 p.

Pecqueur (B.), *Territoire et nouvelles ressources productives*, conférence, Université de Toulouse Le Mirail, May 4<sup>th</sup> 1999, 13 p.

Pecqueur (B.), “Qualité et développement territorial, l’hypothèse du panier de biens et de services territorialisés”, *Économie rurale*, 261, 2001, p. 37-49.

Scheffer (S.), *Qu’est-ce qu’un produit alimentaire lié à une origine?*, thèse, Université Paris I-Panthéon Sorbonne, UFR de Géographie, 2002, 593 p.

Uguet (J.), “Ces AOC qui paient le plus”, *PLM*, 341, 2003, p. 14-17.

## CHAPTER 6

Bonetti (E.), “The Effectiveness of Meta-Brands in the Typical Product Industry: Mozzarella Cheese”, *British Food Journal*, 106 (10-11), 2004, p. 746-766.

Callois (J. M.), “Quality Labels and Rural Development: A New Economic Geography Approach”, *Cahiers d’économie et sociologie rurales*, 78, 2006, p. 32-51.

Chirsty (R.) and Norris (G.), “Discovery Markets. Communicating Product Identities in Specialised Sectors”, *British Food Journal*, 101 (10), 1999, p. 797-808.

Di Monaco (R.), Di Marzo (S.), Cavella (S.) and Masi (P.), “Valorization of Traditional Foods. The Case of Provolone del Monaco Cheese”, *British Food Journal*, 107 (2), p. 98-110.



Galindo (P.), “Leche y productos lácteos. Reconversión y trazabilidad en toda la cadena”, *Distribución y Consumo*, 77, 2004, p. 101-115.

Ikerfel, *Ikerfel estudio sobre hábitos, actitudes e imagen del queso en el mercado español*, Madrid, MAPA, 2002.

Instituto de desarrollo económico del principado de Asturias, *El sector lácteo en Asturias*, 2006.

Instituto nacional de consumo, *Las tendencias del consumo y del consumidor en el siglo XXI*, Madrid, Ministerio de Sanidad y Consumo, 2000.

Jiang (P.), “The Role of Brand Name in Customization Decisions: A Search Versus Experience Perspective”, *Journal of Product and Brand Management*, 13 (2), 2003, p. 73-73.

Kupiec (B.) and Revell (B.), “Measuring Consumer Quality Judgements”, *British Food Journal*, 103 (1), 2001, p. 7-22.

Kuznesof (S.), Tregear (A.) and Moxey (A.), “Regional Foods: A Consumer Perspective”, *British Food Journal*, 99 (6), 1997, p. 199-206.

Langreo (A.), “Entre los nuevos productos, la calidad estándar y los productos de calidad diferencial. El ejemplo del sector lácteo: leche de consumo, refrigerados y quesos”, *Distribución y Consumo*, 85, 2006, p. 24-29.

López Tapia (J.), “El sector lácteo, ante los retos y las oportunidades de la innovación constante”, *Distribución y Consumo*, 85, 2006, p. 85-94.

MAPA, *Hechos y cifras de la agricultura, la pesca y la alimentación en España*, Madrid, MAPA, 2006.

MAPA, *Datos de las denominaciones de origen protegidas (DOP) e indicaciones geográficas protegidas (IGP) de productos agroalimentarios. Años 2003 y 2004*, 2005.

Pratesi (C. A.), “Editorial”, *British Food Journal*, 104 (6), 2002, p. 413-416.

Tendero (A.) and Bernabéu (R.), “Preference Structure for Cheese Consumers. A Spanish Case Study”, *British Food Journal*, 107 (2), 2005, p. 60-73.

Thakor (M. V.) and Lavack (A. M.), “Effect of Perceived Brand Origin Associations on Consumer Perceptions of Quality”, *Journal of Product and Brand Management*, 12 (6), 2003, p. 394-407.

Internet:

[www.agroalimentación.coop](http://www.agroalimentación.coop) (Spanish Confederation of Agricultural Cooperatives' web portal).

[www.fenil.org](http://www.fenil.org) (FENIL, Spanish Dairy Federation, 2006).

## CHAPTER 7

Andersen (H.), Oksbjerg (N.) and Therkildsen (M.), “Potential Quality Control Tools in the Production of Fresh Pork, Beef and Lamb Demanded by the European Society”, *Livestock Production Science*, 2004.

Barkema (A.), Drabentstott (M.) and Welch (K.), “The Quiet Revolution in the U.S. Food Market”, *Economic Review*, May-June 1991.

Becker (T.), Eckhard (B.) and Glitsch (K.), “Consumer Perception of Fresh Meat Quality in Germany”, *British Food Journal*, 12 (3), 2000, p. 228-248.

Hobbs (J.) and Andrew (J.), "Incentives Structures for Food Safety and Quality Assurance: An International Comparison", *Food Control*, 13, 2001, p. 77-81.

Holleran (E.), Bredahl (M.) and Zaibet (L.), "Private Incentives for Adopting Food Safety and Food Quality Assurance", *Food Policy*, 24 (3), 1999.

Ibn Khaldoun (A.), *Al Moukaddima*, Sildar Tunisie, 2006.

Laajimi (A.), Garcia (M.) and Gharbi (M.), "Introducing HACCP System in the Tunisian Dates Sector: An Exploratory Case Study", *New MEDIT*, 3, 2004.

Paraskeva (M. F.), Elizabeth (E.), Charles (S. B.) and Victor (K.), "Consumer Attitudes and Perception of Available Organic Milk: A Comparison of the Greek and the British Situation", in J. Powell *et al.* (eds), *UK Organic Research: Proceedings of the COR Conference, 26-28<sup>th</sup> March 2002, Aberystwyth*, Aberystwyth, Organic Centre Wales, 2002, p. 335-336.

Smith (J. R.), "The Survival in Latin Palestine of Muslim Administration", in P. M. Holt (ed.), *The Eastern Mediterranean Lands in the Period of Crusades*, Warminster, Aris and Phillips, 1977.

Trail (B.), *Perspective des marches*, AGB/Euro-panel, FAO, 1992.

Zaibet (L.) and Bredahl (M.), "The Gains from ISO Certification in the UK Meat Sector", *Agribusiness: An International Journal*, 13 (4), 1997.

Zaibet (L.), Bachta (M. S.) and Bredahl (M.), "Relevance of Food Quality Standards in the Euro-Tunisian Partnership", *MEDIT* 3, December 1999.

Zaibet (L.), Bachta (M. S.), Laajimi (A.) and Abbassi (M.), "Consumers' Perception of Food Quality in Tunisia", *International Journal Food and Agribusiness Marketing*, 16 (2), 2005.

Zaibet (L.) and Ammar (A.), "Consumers' Perception of Small Ruminants' Meat Product Quality in Tunisia" (PFE, ESA Mograne), in Project Report, *Improving the Livelihood of Small ruminants' Farmers* (ILRI-ICARDA-IRESA), 2006.

Zaibet (L.), Ben Salem (H.) and Salah Bachta (M.), "Analyse de la décision contractuelle des producteurs du lait en Tunisie", *Tropicultura*, 23 (3), 2005, p. 154-161.

### 3 QUALITY AND STRATEGY

#### of the milk and milk product industries

##### CHAPTER 8

CNIEL, *L'Économie laitière en chiffres*, 2006.

Gauthier (S. F.), Pouliot (Y.) and Maubois (J. L.), "Growth Factors from Bovine Milk and Colostrum: Composition, Extraction and Biological Activities", *Le Lait*, 86 (2), 2006, p. 99-125.

Jouan (P.), *Procédé d'obtention d'une fraction protéique enrichie en TGF-beta sous forme active, fraction protéique et applications thérapeutiques*, Brevet WO 03/006500 A1, 2001.

Leszek (J.), Inglot (A. D.), Januz (M.), Lisowski (J.), Krukowska (K.) and Georgiades (J. A.), "Colostrinin®: A Proline-Rich Polypeptide (PRP) Complex Isolated from Ovine Colostrum for Treatment of Alzheimer's Disease. A Double Blind, Placebo Controlled Study", *Archivum Immunol. Therapiae Experimentalis*, 47, 1999, p. 377-385.

Maubois (J. L.) and Ollivier (G.), "Extraction of Milk Proteins", in S. Damodaran and A. Paraf (eds), *Food Proteins and their Applications*, New York (N. Y.), Marcel Dekker, 1997, p. 579-595.

Maubois (J.-L.), Fauquant (J.), Famelart (M. H.) and Caussin (F.), "Milk Microfiltrate, a Convenient Starting Material for Fractionation of Whey Proteins and Derivatives", 3<sup>rd</sup> International Whey Conference, Munich, September 11<sup>th</sup>-14<sup>th</sup> 2001.

Parodi (P. W.), "Anti-Cancer Agents in Milk Fat", *Australian Journal of Dairy Technology*, 58, 2003, p. 114-118.

Piot (M.), Fauquant (J.), Madec (M. N.) and Maubois (J.-L.), "Preparation of Serocolostrum by Membrane Microfiltration", *Le Lait*, 84 (4), 2004, p. 333-341.

Portman (R.), *Composition for Reducing Caloric Intake*, US patent 0077530 A1, 2004.

Quiblier (J.-P.), Ferron-Baumy (C.), Garic (G.) and Maubois (J.-L.), *Procédé de traitement des laits permettant au moins de conserver leur aptitude fromagère*, Brevet EP 0 542 583 B1, INRA, 1992, 8 p.

Saboya (L.) and Maubois (J.-L.), "Current Developments of Microfiltration Technology in the Dairy Industry", *Le Lait*, 80 (6), 2000, p. 541-553.

Takada (Y.), Kobayashi (N.), Matsuyama (H.), Kato (K.), Yamamura (J.), Yahiro (M.), Kumekawa (M.) and Aoe (S.), "Whey Proteins Suppresses the Osteoclast-Mediated Bone Resorption and Osteoclast Cell Formation", *International Dairy Journal*, 7, 1997, p. 821-825.

## CHAPTER 10

AESA, *Guía para la aplicación del sistema de trazabilidad en la empresa agroalimentaria*, Madrid, AESA-Ministerio de Sanidad y Consumo, 2004.

Alforja, "Los productos lácteos compiten por renovarse", *Alforja*, 308, March 2006, p. 134-144.

Álvarez del Campo (J.), "El vacuno de leche español, entre la espada y la pared", *Cuadernos La tierra*, 6, April 2006, p. 24-30.

Buxadé Carbó (C.) (ed.), *La industria láctea en España. Análisis de su futuro ante los cambios estructurales que se avecinan*, Madrid, Fenil, 2004, 374 p.

Dónega (J.) and Paz Fernández-Albalat Ruiz (M<sup>a</sup>), "Reflexiones sobre la innovación en el sector lácteo", *Cuadernos La tierra*, 6, April 2006, p. 57-60.

Calcedo Ordóñez (V.), "La producción de leche: una reestructuración que no cesa", *Cuadernos La tierra*, 6, April 2006, p. 39-49.

Díaz Yubero (M. Á.), "Colaboración necesaria y positiva", *Cuadernos La tierra*, 6, April 2006, p. 61.

Escribano (C.), "El sector lácteo en España", *La tierra*, 196, May-June 2006, p. 22-25.

European Commission, *L'Agriculture dans l'Union européenne. Informations statistiques et économiques 2005*, Bruxelles, European Commission, 2006.

Galindo (P.), "Leche y productos lácteos. Reconversión y trazabilidad en toda la cadena", *Distribución y Consumo*, 77, September-October 2004, p. 101-115.

Herrero Álamo (L.), "Denominaciones de origen de quesos de España", *Anuario Lácteo 2005*, Madrid, Publicaciones Técnicas Alimentarias, 2006, p. 71-86.

López-Calleja (I.), González (I.), Fajardo (V.), Martín (I.), Hernández (P. E.), García (T.) and Martín (R.), “Situación actual del mercado de leche y queso”, *Industrias lácteas españolas*, 326, April 2006, p. 41-53.

MAPA, *Datos de las denominaciones de origen protegidas (DOP) e indicaciones geográficas protegidas (IGP) de productos agroalimentarios*, Madrid, MAPA, 2002.

MAPA, *Libro blanco de la agricultura y el desarrollo rural*, Madrid, MAPA, 2004a.

MAPA, *Análisis de la cadena de producción y distribución del sector de lácteos*, Madrid, MAPA, 2004b.

MAPA, *La agricultura, la pesca y la alimentación en España*, Madrid, MAPA (2005), 2006a.

MAPA, *Anuario de estadística agralimentaria*, Madrid, MAPA, 2006b.

MAPA, *La Industria alimentaria. Empresas certificadas ISO 9000 y 14000*, Madrid, MAPA, 2006c.

MAPA, *Red Contable Agraria Nacional*, Madrid, MAPA (2001), 2006d.

MAPA, *Boletín mensual de estadística*, Madrid, MAPA, various issues.

MAPA, *La Alimentación en España*, Madrid, MAPA, various issues.

MERCASA, *Alimentación en España. Producción, industria, distribución y consumo*, Report 2006, Madrid, MERCASA, 2006.

Mili (S.), “Transformaciones del consumo alimentario y su repercusión en el sistema agroalimentario”, *Revista española de estudios agrosociales y pesqueros*, 205, 2005, p. 221-247.

Sineiro García (F.) and Valdès Paços (B.), “Evolución del mercado y de la estructura productiva del sector lácteo español desde la integración en la CEE”, *Economía agraria y recursos naturales*, 1 (1), 2001, p. 125-148.

## CHAPTER 11

Ait El Mekki (A.), Ghersi (G.), Hamimaz (R.) and Rastoin (J. L.), *Prospective agroalimentaire Maroc 2010*, Fondation Omnium nord-africain (ONA), 2002.

Anonymous, “La grande distribution, moteur de développement économique?”, *Revue Agriculture du Maghreb*, special issue “Rayon agroalimentaire”, Casablanca, 2006.

Araba (A.), Benjelloun (S.), Hamama (A.), Hamimaz (R.) and Zahar (M.), “Organisation de la filière laitière au Maroc”, in M. Padilla, T. Ben Saïd, J. Hassainya and P. Le Grusse (eds), *Les Filières et marchés du lait et dérivés en Méditerranée: état des lieux, problématique et méthodologie pour la recherche*, Montpellier, CIHEAM-IAMM, coll. “Options méditerranéennes, serie “B/ 32”, 2001, p. 47-62.

Clair (F.), “Produits laitiers: les allégés ont-ils un avenir au Maroc?”, *Revue Agriculture du Maghreb*, special issue “Rayon agroalimentaire”, Casablanca, 2006.

Directorate for Statistics, *Enquête de consommation et des dépenses des ménages 2000-2001. Résultats préliminaires*, 2005.

Directorate for Statistics, *Enquête nationale sur les niveaux de vie des ménages 1998/1999*, 2001.

Duval (E.), *Le Marché des produits laitiers au Maroc. Missions économiques*, French Embassy in Morocco, 2004.

El Aabdouni (M.), *Contribution à la mise en place d'un système de management de la qualité conformément aux exigences de la norme ISO 9001 V 2000 – Cas d'une laiterie*, mémoire de troisième cycle pour l'obtention du diplôme d'ingénieur d'État en industries agroalimentaires, Rabat, Institut agronomique et vétérinaire Hassan-II, 2005.

El Fellah (A.), *Contribution à l'étude de la démarche traçabilité des produits laitiers*, mémoire de troisième cycle pour l'obtention du diplôme d'ingénieur d'État en industries agroalimentaires, Rabat, Institut agronomique et vétérinaire Hassan-II, 2005.

Ministry of Agriculture, *Textes réglementaires régissant la production, la commercialisation et le contrôle du lait et des produits laitiers*, Directorate for Animal Husbandry, 2003.

Ministry of Agriculture, *Stratégie de développement de l'élevage. Filières de production animale*, vol. II, Rabat, Colloque national de l'agriculture et du développement rural, July 19<sup>th</sup>-20<sup>th</sup> 2000.

Ministry of Agriculture, *Élevage en chiffres*, Direction d'Élevage, Service suivi et évaluation, 2005.

Ministry of Industry and Trade, *Les Grands Magasins. Étude sectorielle*, 2002.

Omnium nord-africain, *La Centrale laitière: le pionnier de l'industrie laitière au Maroc*, Groupe ONA, 2006.

Srairi (M. T.), "Diagnostic de situations d'élevage bovin laitier au Maroc. Perspectives d'amélioration des performances", *Bulletin technique de transfert de technologie en agriculture*, MADER/DERD, 144, 2004.

## SECTORAL INDICATORS

Allaya (M.), MEDAGRI. *Annuaire des économies agricoles et alimentaires des pays méditerranéens et arabes*, Montpellier, CIHEAM-IAM, 2006.

*Encyclopédie de l'état du monde*, Paris, La Découverte, 2006.

FAOSTAT, 2005.

IMF, *Statistiques financières internationales*, 2005.

UNCTAD, *Manuel de statistiques du commerce international et du développement*, 2005.

World Bank, *World Development Indicators*, 2005.



# Table OF DOCUMENTS

## 1 THE FOUNDATIONS of food safety

### Chapter 1

Box 1	How is food safety to be measured?	29
Table 1	Estimation of costs attributable to certain pathogens, United States, 2000	32
Table 2	Willingness to pay for various types of food products, China, 2001	34
Table 3	Opinions on the level of regulatory provisions in France, May 2000	35
Table 4	Principle food accidents recorded in Western Europe between 1980 and 2000	36
Box 2	Food safety in southern and eastern Mediterranean countries: the case of Algeria	37
Table 5	Number of undernourished persons, 1969-2003	39
Table 6	Estimation of mortality by cause in Mediterranean countries, 2002	40
Chart 1	Mortality attributable to food-based diseases and health expenditure in the Mediterranean countries, 2002	41
Table 7	The government services in charge of food safety in the EU Mediterranean countries	45
Table 8	Production of standards at the international level in the agro-food field	47
Table 9	ISO 9001 (2000) certification in Mediterranean countries	59
Table 10	ISO 14001 certification in the Mediterranean countries	59
Box 3	Standards relating to food safety: a governance challenge	60
Table 11	Segmentation of the French food market, 2004	62
Map 1	Estimated total deaths, by cause, 2002	66
Map 2	Prevalence of obesity for age group 15 years and more, 2002	67
Map 3	ISO 14001 certifications, 2004	67
Table 12	Prevalence of undernourishment in total population (%)	68

### Chapter 4

Figure 1	EU logos for identifying PDO, PGI and TSG	112
Chart 1	Distribution of the number of PDO, PGI and TSG food products across EU countries	116

Chart 2	Distribution of the number of PDO/PGI and TSG across food categories	117
Chart 3	PDO/PGI and TSG products registered per sector and country	118
Chart 4	The PDO/PGI olive oil sector	119
Chart 5	The PDO/PGI cheese sector	119
Chart 6	The PDO/PGI fruit, vegetables and cereals sector	119
Map 1	Organic farmland in EU-15	128
Chart 7	Sales value of organic food products	130
Table 1	The PDO/PGI and TSG sectors in France	131
Table 2	The PDO/PGI and TSG sectors in Italy	132
Table 3	The PDO/PGI and TSG sectors in Spain	133
Table 4	The PDO/PGI and TSG sectors in Portugal	135
Table 5	The PDO/PGI and TSG sectors in Greece	136

## 2 THE QUALITY OF MEDITERRANEAN FOOD PRODUCTS

### the case of milk products and milk derivatives

#### Chapter 5

Table 1	ID file of the Roquefort PDO industry	152
Map 1	Roquefort designation area	153
Table 2	Significance of the Roquefort industry Farms, 2005	155
Table 3	Economic importance of the Roquefort industrial jobs, 2005	155
Table 4	Development of the Roquefort industry since 1950	160
Table 5	Output trends of several cheese industries after obtaining an RDO	163
Map 2	Ewe's milk producers in Roquefort, 2004	165
Chart 1	Number of tourists visiting the Roquefort Country, 2004	169
Figure 1	The "Roquefort Country" zones and logo	170

#### Chapter 6

Table 1	Milk and cheese production in Spain (in tonnes) 2000-2004	177
Chart 1	Spanish cheese production, 2000-2004	178
Table 2	Consumption trends of different types of cheese in Spain (tonnes) broken down into household and non-household (Horeca), 2000-2004	179
Table 3	Spanish per capita consumption trends for different varieties of cheese (kg), 2004-2005	179



Table 4	Number of Spanish PDO cheeses plus sales volume in tonnes, 2000-2004	<b>180</b>
Chart 2	Revenue from Spanish PDO cheeses, 1993-2004	<b>181</b>
Table 5	Types, production areas, year of establishment and average output for Spanish PDO cheeses	<b>182</b>
Chart 3	Share of Spanish PDO cheese market, 2004	<b>185</b>
Table 6	Share of Spanish PDO/PGI cheese market by volume and Value, 2003-2004	<b>186</b>
Chart 4	Cheese import trends for Spain, 2000-2004	<b>190</b>
Chart 5	Cheese export trends for Spain, 2000-2004	<b>190</b>

## Chapter 7

Table 1	Implementation of the PMN scheme from 1996 to 2006	<b>195</b>
Chart 1	Distribution of businesses involved in the programme by reference system, by May 2006	<b>196</b>
Chart 2	Distribution of agro-food businesses involved in the programme by subsector, by May 2006	<b>196</b>
Table 2	Share of certification costs paid by businesses	<b>197</b>
Table 3	Certification bodies in Tunisia	<b>198</b>
Table 4	Adoption of quality systems (all industries) according to certification bodies and reference systems	<b>199</b>
Table 5	Certified agro-food products, 2006	<b>199</b>
Chart 3	Evolution of the number of registered brands, 1984-2005	<b>200</b>
Chart 4	Evolution of the number of brands in the agro-food sector by category, 2000-2005	<b>201</b>
Table 6	Organic output in Tunisia	<b>201</b>
Table 7	Evolution of organic product exports in Tunisia	<b>202</b>
Map 1	Number of farmers in organic agriculture, 2006	<b>202</b>
Map 2	Acreage farmed organically, 2006	<b>202</b>
Chart 5	Distribution of organic farming by crop, 2006	<b>203</b>
Chart 6	Perception of the quality of red meat, 2004	<b>205</b>
Chart 7	Willingness to pay for the quality of red meat, 2004	<b>205</b>
Chart 8	Willingness to pay for quality, 2004	<b>205</b>
Table 8	Perception of food product quality	<b>206</b>
Table 9	Specific quality reference systems in the national programme for promoting quality	<b>208</b>
Table 10	International classification of (agro-food) products and services	<b>208</b>
Table 11	Numbering of NT standards in the agro-food sector	<b>209</b>

## 3 QUALITY AND STRATEGY of the milk and milk product industries

### Chapter 8

Chart 1	Utilisation of the milk collected, 2005	216
Chart 2	Cheeses made in France, 2005	218

### Chapter 9

Table 1	Italian PDO cheeses in 2005	228
Chart 1	Chain of value of the Italian milk industry in 2005, in millions of euros	231
Chart 2	Distribution of value in the Italian milk industry, 2003-2005	232
Chart 3	Number of dairy farms and marketed output of cow's milk in Italy, 1988/89 - 2005/06	233
Table 2	Exchange of milk quotas between producers in Italy, 2002/03-2004/05	234
Table 3	Production units operating in milk treatment and/or processing in Italy, 2001-2004	235
Table 4	Total turnover and total cheese turnover of the principal Italian enterprises in the cheese sector	236
Table 5	Concentration coefficients in the Italian milk industry, 2004- 2005	237
Table 6	Classification by turnover of the principal enterprises in the milk subsectors in Italy, 2005	237
Table 7	Retail sales of milk products in Italy, 2005	241
Chart 4	Drinking milk distribution in Italy, 2005	242
Chart 5	Cheese distribution in Italy, 2005	243
Chart 6	Yoghurt + desserts and butter distribution in Italy, 2005	244

### Chapter 10

Table 1	Milk and milk product output in the world, in the EU and in Spain (1000 T)	246
Map 1	Spanish milk output: regional distribution, 2003	247
Table 2	Stratification of farms with quotas, April 2006	248
Table 3	Structural indicators and economic-financial results of the cattle dairy farms covered in the National Agrarian Network (RECAN), 2000-2003	249
Chart 1	Prices paid to producers (PP) and output value (OV), 1994-2003	250
Table 4	Market prices of milk products (euros/100 kg)	251
Chart 2	Foreign trade in milk and milk products, 2000-2005	251

Table 5	Trade balance of milk products in Spain, 2003 (1000 T)	<b>252</b>
Chart 3	Consumption of milk and milk products (MMP) in Spain, 1995-2004	<b>256</b>
Table 6	Evolution of the Spanish milk market by segment	<b>257</b>
Table 7	The Spanish yoghurt market by segment	<b>257</b>
Table 8	Commercial distribution of milk and milk products by form of commercial structure (household purchases)	<b>259</b>
Table 9	PDO and PGI cheese output and marketing, 1998-2002	<b>265</b>
Table 10	PDO cheeses in Spain, data from 2002	<b>266</b>
Table 11	Certification of quality assurance and management systems (ISO 9000) and of environmental management systems (ISO 14001) in the Spanish milk industry, 1997-2004	<b>267</b>
Table 12	Fundamental indicators of the Spanish milk industry	<b>268</b>
Table 13	Composition of output value in the Spanish milk industry (%)	<b>268</b>
Table 14	Principal milk groups in Spain by volume of milk collected (million litres)	<b>270</b>
Table 15	Main firms processing long-life and pasteurised milk (million L)	<b>271</b>
Table 16	Main yoghurt-processing firms (T)	<b>272</b>
Table 17	Main firms processing fresh milk desserts (T)	<b>273</b>
Table 18	Main cheese importing and processing firms (T)	<b>275</b>

## Chapter 11

Chart 1	Trend in milk product consumption, 1975-2004	<b>281</b>
Table 1	Average annual expenditure on milk products in Morocco (current dirhams)	<b>282</b>
Table 2	Quantity consumed (FME), expenditure (dh) and food budget share according to income bracket and the residential environment	<b>284</b>
Table 3	Milk derivative consumption trend (in litres of fresh milk equivalent)	<b>285</b>
Table 4	Evolution of the share of processed milk (million litres)	<b>291</b>
Table 5	Structure and performance of the milk industry	<b>291</b>
Table 6	Main milk-processing plants	<b>292</b>
Chart 2	Milk and milk product marketing channels in Morocco	<b>295</b>





