



OPTIONS méditerranéennes

SERIES B : Studies et Research
Number 40

**Report on Organic Agriculture
in the Mediterranean Area**

Mediterranean Organic Agriculture Network

CIHEAM-IAMB



OPTIONS

Méditerranéennes

SERIE B: Studies And Research
NUMBER 40

Report on Organic Agriculture
in the Mediterranean Area

Mediterranean Organic Agriculture Network

Options Méditerranéennes, Série B n. 40

Report on Organic Agriculture in the Mediterranean Area

Opinions, data and facts exposed in this number are under the responsibility of the authors and do not engage either CIHEAM or the Member-countries.

Les opinions, les données et les faits exposés dans ce numéro sont sous la responsabilité des auteurs et n'engagent ni le CIHEAM, ni les Pays membres.

La maquette et la mise en page de ce volume de Options
Méditerranéennes Séries B
ont été réalisées à l'Atelier d'Édition de l'IAM Bari
This volume of Options Méditerranéennes Series B has been
formatted and paged up
by the IAM Bari Editing Board

Copy number : 300

Printed by Tecnomack - Bari, Italy
November 2002

Report on Organic Agriculture in the Mediterranean Area

Edited by
Lina AL BITAR

Bari: CIHEAM

(Centre International de Hautes Etudes Agronomiques
Méditerranéennes)

p. 165, 2002

Options Méditerranéennes, Série B, N. 40

ISSN : 1016-1228

ISBN : 2-85352-251-2

© CIHEAM, 2002

Reproduction partielle ou totale interdite
Reproduction in whole or in part

-----sans l'autorisation
the consent

is not permitted without

---d'«Options Méditerranéennes»

of «Options Méditerranéennes»

Contents

Presentation	p. 3	
Foreword	p. 5	
Part I - ORGANIC AGRICULTURE IN THE MEDITERRANEAN AREA: STATE OF THE ART		
1. Origin and development of organic farming	p. 9	
2. Regulatory framework	p.11	
2.1 EU rules and regulations on organic farming	p.	11
2.2 The influence of the regulatory framework in the Mediterranean Basin	p.12	
2.3 Support Policies	p.15	
3. Sector Overview	p.16	
3.1 Data and problems of organic farming development at the world level	p.16	
3.2 The Mediterranean region	p.19	
3.2.1 The agri-food system	p.19	
3.2.2 The organic agri-food system	p.20	
4. Mediterranean organic agriculture: some major agronomic features	p.23	
4.1 Major agronomic problems of Mediterranean organic farming	p.25	
4.1.1 Overall soil fertility improvement	p.27	
4.1.2 Phytosanitary control	p.31	
4.1.3 Weed control	p.34	
4.1.4 Agroecosystem complexity and its self-regulation: a holistic approach	p.37	
5. The market	p.40	
5.1 The market along the southern and eastern shore	p.42	
6. Conclusive Remarks	p.45	
7. References	p.50	

Part II - COUNTRIES REPORT

- Albania	p.55
- Algeria	p.59
- Egypt	p.61
- France	p.71
- Greece	p.79
- Italy	p.85
- Lebanon	p.109

Presentation

In 1999, CIHEAM (International Centre for Advanced Agronomic Mediterranean Studies), delegated the Mediterranean Agronomic Institute of Bari (IAMB) to animate a research Network in Organic Farming. In September 1999, the CIHEAM-IAMB set up the Mediterranean Organic Agriculture Network (MOAN) to promote the development of scientific, technical and cultural knowledge on organic farming in the Mediterranean Basin. One of the first activities of MOAN was to gather information on organic agriculture in the Mediterranean area. This document is the first report containing such data.

Coordination committee of MOAN

IAMB Deputy Director: Maurizio Raeli

IAMB Consultants: Fabrizio De Castro

Lina Al-Bitar

Vincenzo Fersino

Damiano Petruzzella

Research Group of MOAN

Velesin Peçuli, University of Tirana, Albania

Abdelkader Aissat, University of Blida, Algeria

Ahmed El-Araby, Ain Shams University, Egypt

Gabriel Guet, Groupe de Recherche en Agriculture biologique, France

Renia Bitsaki, Mediterranean Agronomic Institute of Chania, Greece

Giovanni Pacucci, University of Bari, Italy

Jean Estephan, Ministry of Agriculture, Lebanon

Randa Khoury, Institut de Recherches Agronomiques Libanais, Lebanon

Peter Agius, Ministry of Agriculture, Malta

Lahcen Kenny, Institut Agronomique et Vétérinaire Hassan II, Morocco

Roberto Garcia Trujillo, University of Cordoba, Spain

Mohamed Ben Kheder, Centre Technique de l'Agriculture Biologique, Tunisia

Uygun Aksoy, Ege University of Izmir, Turkey

Manolis Kabourakis, International Federation of Organic
Agriculture Movement - AgriBioMediterraneo

Foreword

Organic agriculture is a holistic production management system which promotes and enhances agroecosystem health, including biodiversity, biological cycles and soil biological activity.

In Europe, the process of organic farming has been marked by a number of fundamental steps. Organic farming is supposed to originate in the early 20th century, when a new cultural approach to the use of natural resources got established in Germany. In the last five years, interest and consent on organic farming have continuously increased, both in demand and supply, and by now it involves all the Mediterranean countries. About 17.2 million hectares in the world are organically grown in 120 countries, and the surface is increasingly growing. In Europe there are 3.8 million hectares organically grown by over 130 thousand farms that account for 2.8% of the average European Agricultural Area and 1.8% of farms, respectively.

The worldwide application of unified and/or harmonised production standards for organically produced foodstuffs is extremely important for a greater development of organically grown land and of markets of organic products. The history, the experiences and the dynamics of evolution on the application of organic farming method between the Northern and Southern-Eastern countries shores are different from each other.

Over the last years, organic agriculture has attracted much attention in the Mediterranean countries for both environmental reasons and market opportunities. In the Mediterranean region there are about two million hectares under organic farming. The farms that have adopted this new production method amount to more than 100 000. The Mediterranean region is a worldwide important market for agricultural products and foodstuffs, in particular to the European countries.

Identifying forms for a sustainable use of lands is a primary need in order to reduce the degradation of primary resources, of biodiversity and of the rural environment. Land management through the organic production method is a model which responds to needs of sustainable development. Anyhow, the application of this production method necessitates new knowledge relating to technical, agronomic, legislative and market aspects, in order to produce and sell on the market in compliance with the rules set by the inspection and certification system. The lack

and insufficiency of policies supporting the organic sector slow down the application of this production method in the countries of the south shore. Only recently has organic agriculture been included into national and international research, training and cooperation programmes for development. National and international scientific institutions and some private enterprises have launched research programmes on specific topics which are the core of scientific publications and of debate in conferences and seminars.

In order to respond to the growing information needs on organic agriculture in the Mediterranean area, the Italian offshoot of the International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM) started up in 1999 a Network on Organic Agriculture (MOAN) and in 2000 a Master course on the Mediterranean Organic Agriculture. A preliminary objective of MOAN was to gather detailed data on organic agriculture in the CIHEAM-member states. Based on the analysis of the economic fallout of organic agriculture in each single country, it was tried to reconstruct the economic weight of the whole sector, to cast light on the major technical, agronomic and market issues, on the institutions dealing with education, research and experimentation and to get acquainted with the activities carried out by agencies and organisations operating in this sector.

This first report on Organic Agriculture in the Mediterranean Area is a major contribution to help national and international institutions understanding the phenomenon and bringing up proposals and initiatives for the development of organic and sustainable agriculture.

Deep thanks go to the working group which has contributed to the editing of this report and to all the authors with the wish that MOAN might grow and consolidate its activities in the forthcoming years as an instrument for the development of sustainable agriculture in the Mediterranean countries.

Cosimo Lacirignola
CIHEAM-IAMB Director
General

Enzo Chioccioli
CIHEAM Secretary

Part I
Organic Agriculture
in the Mediterranean Area:
State of the Art

Organic Agriculture
in the Mediterranean Area:
State of the art

Vincenzo FERSINO and Damiano PETRUZZELLA

CIHEAM - Istituto Agronomico Mediterraneo di Bari

1. Origin and development of organic farming

In Europe, the process of organic farming has been marked by a number of fundamental steps. Organic farming is supposed to originate in the early 20th century, when a new cultural approach to the use of natural resources got established in Germany.

At the beginning of the 1920s, this cultural excitement gave rise to the anthroposophical movement, founded by Rudolf Steiner.

The renewed approach to nature led to the elaboration of the principles of biodynamic agriculture based on the concept of healthy and balanced foods, the same fundamental principles that gave rise to organic farming.

In 1943 Lady Eve Balfour, in England, founded the Soil Association, a research body to study the interrelationships between the use of land for agricultural purposes and its effects on the animal and plant kingdom.

Again in the 1940s, in Switzerland, Hans Muller and Hans Peter set up the "organic method".

Distinctive characteristics of this method are the importance attributed to soil humus, the use of composting and reduced-to-minimum soil tillage to prevent altering soil microflora and for an optimal use of renewable resources.

In the 1960-1970s there has been a proliferation of organisations and associations promoting organic farming also in the Mediterranean countries. In 1972, in France, different associations joined to found the International Federation of Organic Agriculture Movements (IFOAM), a body that will set common regulations and guarantees to safeguard organically produced foodstuffs and protect consumers. Today, based on IFOAM standards, many state administrations of different Countries are increasingly recognising organic farming.

In 1973, in the United States, for the first time, the term "organic" became under the protection of the law: the Oregon Administrative Rule established that the term

"organic" means "an agricultural system conducted without using synthetic chemicals".

Further pioneer experiences were made in Egypt (1978) where an association called Sekem gave rise, in the desert, to a biodynamic farm of about 70 hectares where medicinal plants and aromatic herbs are grown.

In the 1980s, in Israel, the Israeli Bio Organic Agriculture Association (IBOAA) was established.

In the same decade, organic farming developed in most of the European countries. In fact, between 1980-88, the minimum standards required for organic production and the designated inspection authorities were introduced in the French legislation.

Such development was followed by the increasing demand for quality products by consumers.

Similar experiences were developed in Morocco (1986) by French organisations, and in Tunisia.

In the 1990s, the advances and changes in the EU Common Agricultural Policy (CAP) and, more generally, the decision-makers' awareness of the environmental impacts of agricultural activities, contributed to create a favourable framework to the development of organic farming.

On 24 June 1991, the EEC Council approved the Regulation no. 2092 published in the Official Journal of 22 July, 1991, "on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs".

In the last years, surfaces being converted to organic farming have largely extended. The enforcement of Regulation (EEC) 2092/91, that defined terms and procedures, and of Regulation (EEC) 2078/92, that granted subsidies to holdings converting to organic, favoured huge and rapid development of organic farming in Europe.

A further and important step was the Community approval of the regulation for the recognition of a logo for organic production (Regulation EEC 331/2000) and the approval of the regulation on organic livestock farming (Regulation EEC 1804/99).

In the Mediterranean, in 1997 the IFOAM - AgriBioMediterraneo was established with its secretariat at the CIHEAM-IAMB (Italy). Since 2000 its headquarters are at EKOLIBURNIA, Rijeka (Croatia).

In 1999, the MOAN (Mediterranean Organic Agriculture Network) was set up through the promotion and support of CIHEAM-IAMB.

That same year, Malta's Organic Agriculture Movements (MOAM) was founded, with the purpose of starting developing organic farming and in view of joining the European Union. The purpose of MOAM is also to start initiatives in the field of training and research, of standards and certification, of rural development and marketing.

So, in the last five years, interest and consent on organic farming have continuously increased, both in demand and supply, and by now it involves all the Mediterranean countries. However, the application of the organic production method is not the result of improvisation or the return to traditional techniques, rather it requires huge investments in knowledge oriented to production and conservation techniques, and compliance with the regulations in force. Also from the point of view of marketing and distribution, a lot has still to be done. In particular, strengthened distribution network and more capillary information are basic prerequisites to allow the potential organic product consumer to effectively meet his/her requirements.

Following on these European and non-European experiences (USA, Japan, Australia), some non-EU Mediterranean countries have started working for the regulatory recognition of organic farming.

2. Regulatory framework

2.1 EU rules and regulations on organic farming

The worldwide application of unified and/or harmonised production standards for organically produced foodstuffs is extremely important for a greater development of organically grown land and of markets of organic products.

Harmonisation of rules and the mutual recognition of regulations of each single Country are important aspects aimed at facilitating trade of organically produced foodstuffs.

In many countries, organic products are under the protection of the law. This applies in the EU countries (Regulation (EEC) 2092/91 and Regulation (EEC) 1804/99, annex 1), Switzerland, Australia, Hungary, USA, Japan and Canada. In the Mediterranean, only Tunisia, Turkey, Israel and Slovenia have national regulations on organic farming. In many other countries actions are being taken in this

sense. The presence of a national regulatory framework on organic farming is important, not only for export, but also to reinforce consumers' culture and trust and, thus, for the development of domestic markets. In June 1999, the Codex Alimentarius Commission of the FAO/WHO, also thanks to the collaboration of IFOAM, launched the Guidelines for the Production, Processing, Marketing and Labelling of Organically produced Foodstuffs. These Guidelines should contribute to have more stable rules that safeguard and regulate organic farming and labelling of organic products in all the countries. In such a way, harmonisation of regulations would be possible worldwide and, consequently, it would be easier to legislate on organic farming matters and international trade of organic products.

A similar objective is expressed in the accreditation programme of IFOAM. IFOAM standards are translated into 19 languages and are continuously updated.

In all the Mediterranean countries there are private bodies for the control and certification of organically produced foodstuffs, taking as reference the standards established in the law in force in the Country (table 1). The organisations working in the southern countries are predominantly European companies that rarely employ local staff.

In fact, except Tunisia and Morocco, in the other countries, inspection and certification bodies exclusively rely on foreign or mixed staff. In many cases, local headquarters are absent and the organisation operates directly through the European or foreign headquarters.

Such bodies operate following essentially the regulations of the European Union and IFOAM standards.

2.2 The influence of the regulatory framework in the Mediterranean Basin

The Mediterranean region is a worldwide important market for agricultural products and foodstuffs, in particular to the European countries. The trade flows between the EU and the southern bank of the Mediterranean are in favour of the EU: over time, the structure of such trade flows has been strongly influenced by the agricultural policy of the EU and strongly affected by periodical "bilateral agreements", that establish conditions and import quotas in trade flows. By the year 2010, the "free trade" area will be established in the Mediterranean region. As for imports of

organically produced products from third countries, the following types are indicated:

Imports from Third Countries whose equivalence is established by the decision of the European Commission, can be marketed solely when they originate in the list expressed in Regulation (EEC) no. 94/92 of 14 January 1992 and subsequent modifications (Regulation (EEC) no. 2092/91, art. 11, paragraphs 1-5), establishing the modes of application on the import regime from Third countries.

The Third countries in question, requested to be included in the list on the basis of the application of an internal regulation on the method of organic farming, in compliance with Regulation (EEC) no. 2092/91 and its annexes. At present, the list in the Annex of the same Regulation (EEC) no. 94/92, reports the Countries authorised to export into Europe on the basis of the "principle of equivalence!": Argentina, Australia, the Czech Republic, Hungary, Switzerland and Israel. Moreover, the said Annex also reports the full information required to allow the identification and import of products, Authorities and Bodies of the Third Countries competent for the issue of certification, Inspection Authority of the Third Country and/or the private Bodies authorised to supervise operators, the indications concerning processing units and packaging, exporters and marketable agricultural products.

Should another country wish to be included in the said list, the Commission reserves to examine its application for membership "after having received the application for inclusion, submitted by the representatives of the third Country", with all the required information.

The inclusion of the third country in the list "can be subject to the condition that the actual application of the rules of production and the inspection modes in the country be periodically checked by independent experts, and that they regularly write a report on it".

Only after accomplishing the above-said procedure, the EU recognises the regulatory and the certification and inspection systems in force in the third country as equivalent to that in force in the EU. The recognition of equivalence allows free movement within the Community, excepted the enforced provisions of law and referred to the agricultural sector in general.

The second possibility is related to the application of Regulation (EEC) no. 2491/92 of 19 December 2001, that modifies Annex III of Regulation (EEC) no. 2092/91 in those

countries where no national legislation does exist and/or equivalence to the national legislation is not recognised, and that allows the inclusion of the list laid down in article 11 of Regulation (EEC) no. 2092/91 (and reported in the Annex to Regulation (EEC) no. 94/92). In this case, it is the Member State that issues a specific authorisation to import in accordance with Regulation (EEC) no. 2092/91, art. 11, paragraph 6.

To be included in the said list, it is necessary to ensure to the final consumer "the traceability of organic agricultural products at the various steps of the commercial chain and their conformity to the provision of Reg. (EEC) no. 2092/91".

Generally, these provisions are performed by involving an Inspection Body, approved at the European level, that guarantees to the EU the compliance with the minimum requirements for organically produced agro-food products included in Regulation (EEC) no. 2491/2001. This regulation establishes the "minimum inspection requirements and the precautionary measures under the inspection scheme, referred to in articles eight and nine of Regulation (EEC) no. 2092/91", concerning the modes of execution of the inspection visits, the required documentation, the modes of packaging and transport of products to other units or production/packaging factories or units and the modes of storage and access to equipment.

Some specific provisions are defined that apply to all units involved in the production or import of plant products and foodstuffs from Third countries.

At present (validity until 2005), the Third Mediterranean countries from which it is possible to import into the EU through the guarantee given by the Inspection Body (approved at the European level) are the following: Bosnia Herzegovina, Croatia, Cyprus, Egypt, Morocco, Serbia and Yugoslavia.

From July 2002, the Regulation (EEC) 1788/2001 of 7 September 2001 will come into force. It fixes the modes of application of the provisions on the inspection certificate for the import of products from Third countries, in compliance with article 11 of the Regulation (EEC) 2092/91. Thus the existing procedures will have to be revised.

2.3 Support Policies

On the south-eastern bank of the Mediterranean, co-ordinated interventions that may support the development of organic farming are lacking. Few initiatives are

undertaken on different sectors, ranging from training and extension to experimentation.

Moreover, in the Mediterranean countries in particular, there is a lack of national or regional support policies to farms, both in direct and indirect form, aimed at favouring conversion to organic farming.

Therefore, differently from what has occurred in Europe, the development of organic farming in the Mediterranean is taking place solely for market reasons, stimulated by the high demand for products from the EU, the USA and Japan.

In fact, the major organic holdings are owned or "controlled" by large firms or foreign multinationals that, of course, produce to export without triggering local development.

As regards the European experience on the application of Regulation (EEC) 2078/92, the results obtained have definitely gone beyond expectations.

Through the Agro-Environmental Programmes Regulation 2078/92 (EC, 1998), farmers are requested to adopt environmentally friendly practices, and measures are taken to compensate for losses in income and additional costs. Such programme has involved 900 000 farms (except Germany) and 27 million hectares, equal to 20% of the European agricultural surface. The expenditure for the 12 countries of the EU raised from 0.1 billion ECU in 1993 to estimated 1.2 billion ECU in 1998, equal to about 4% of the European Agricultural Guidance and Guarantee Fund (EAGGF) expenditure, guarantee section.

The actions relative to both integrated pest management and integrated production are the most widespread. Forty per cent of the surface covered by the Regulation is involved in the application of these two actions that represent 56% of submitted applications.

Organic farming, with 15.9% of total surface, ranks second and goes beyond any forecast. The planned objective of the EU was to reach 12% of total Agricultural Area in the early four years.

This important result is due to the strong commitment of public administrations in the diffusion of low environmental impact production methods.

Considering all of the above, one may wonder: Is the EU approach to favour organic development the correct one?

3. Sector Overview

3.1 Data and problems of organic farming development at the world level

Information reported in this paragraph are based on the data supplied by the German Foundation Stiftung Ökologie & Landau (SÖL). About 17.2 million hectares in the world are organically grown in 120 countries, and the surface is increasingly growing (Willer, 2001b).

The country with the largest area is currently Australia with 7.7 million hectares, followed by Argentina with 2.8 million hectares, and Italy with over one million hectares (figure 1).

In Europe there are 3.8 million hectares organically grown by over 130 thousand farms that account for 2.8% of the average European Agricultural Area (AA) and 1.8% of farms, respectively.

In some EU countries (Austria, Italy, Finland and Denmark) the incidence of organic AA exceeds 6% of the national AA, thus confirming the great interest of the agricultural world towards organic products (figure 2).

In the European Community the highest growth is observed in Scandinavia and in the Mediterranean region, but Eastern Europe too organic products; in particular, Canada and the USA show huge growth rates of organically-grown surface areas. Actually, the surface area in the USA doubled from 1995 to 2000, due to a growing domestic demand and an increasingly higher export share towards Japan and Europe.

In nearly all the Latin American countries the organic method is applied. The highest percent values are found in Argentina, Brazil, Costa Rica, El Salvador and Suriname, but sometimes the organically-grown surface does not exceed 0.5% of the AA. The growth rate is, however, high. In Argentina the organic area has grown, in less than 10 years, from 5500 hectares in 1992 to 2.8 million hectares during 2001 (Willer, 2001b).

In Africa the traditional farming methods are ecological, but certification is adopted in few countries; consequently, products are sold through conventional markets and there are few data on organic productions. In the Trade World Conference organised by IFOAM in October 1999 in Florence, it has come out clearly that something is moving also in this continent. Indeed, the gradual soil exploitation and land erosion are leading Africa towards the awareness of the beneficial effect that organic farming could have to reduce the on-going degradation and to safeguard natural resources. Another major reason for

growth in Africa is the possibility to market organic products in the industrialised countries.

In Asia there are few countries that have clear guidelines for organic farming. However China, India, Philippines, Thailand and Malaysia are now setting out national standards and some countries have already their own inspection bodies.

In Japan the Ministry of Agriculture approved a law on organic farming in June 2000 and in the meantime, 26 Certification Bodies have been registered. In Asian countries organic farming finds its major reasons in self-consumption and land reclamation.

On the other hand, some studies conducted in India and Indonesia show that organic farming yields can be higher than conventional ones (Willer, 2001a).

A key problem of the whole sector is related to export. The major world producers are Israel, Turkey, China and India, but there are nearly everywhere great distribution difficulties.

In Oceania organic farming is largely affected by the huge demand coming from Europe, Asia and North America: exports are supported through State aid and subsidies. In Australia and New Zealand there are certification bodies recognised by IFOAM.

An exception that cannot be neglected is Japan: it is a great importer, it had a volume of business of 2.5 billion dollars in 2000; it is one of the largest world markets of organic products (ITC, 2001).

The data illustrated above are helpful to understand the recent developments and potentials of the sector in different world regions. However, there is still much to do to strengthen the conversion of farms and facilitate the conversion process also for the farms involved in the processing and marketing of organic products.

3.2 The Mediterranean region

3.2.1 The agri-food system

Agriculture in the Mediterranean shows a great diversity between the EU- and the non-EU Mediterranean countries, although they have, in productive terms, similar properties for the "Mediterranean climate". Differences are related to various aspects: (i) a different economic relevance of the agricultural and agri-food sectors on the overall economy of the country; (ii) a diversified weight of the

agricultural workers on the total working population; a different capacity to access financial resources for new investments; (iii) a different availability of water resources; (iv) a different ability to access the knowledge resources and (v) a different role of agriculture (CIHEAM, 2000).

As shown in figure 3, the contribution of the agricultural sector to the overall economy varies a lot from country to country: in 1999 the weight of the agricultural sector on the national economy was 63% in Albania, 16% in Morocco and 14% in Tunisia, whereas it equalled about 2% in France, Italy and Portugal.

The agricultural working population also shows wide differences in different Mediterranean countries: with respect to the total working population, in 1999 it was about 50% in Albania and Morocco, 40% in Turkey, 34% in Egypt and only 4% in France and 6% in Italy.

The agricultural sector of the Mediterranean countries is, however, very relevant for the economy of the region, both for non European countries, where it accounts for over 10% of the Gross Domestic Product, and for the most advanced economies, where it is the basis of an important agri-food and processing industry.

Moreover, the agri-food sector plays different roles in the rural societies of the Mediterranean, ranging from the production for self-consumption to rural development, including the environmental services and the symbolic and cultural functions.

The Mediterranean region is a world-wide market for food and agricultural products. It includes the major cereal-producing countries, such as France and Turkey, as well as the major wheat importers, like Egypt.

Many Mediterranean countries, especially the Southern ones, have been characterised, over the last few years, by a fast population growth, an increase in the per capita income and a change in the food habits, that have seen a decline of cereals and an increased consumption of animal-based products. In these countries, the growth in the total population and the growth in food demand clash with a reduced agricultural population, a lower availability of resources for agriculture (such as water resources) and an increase in food and agricultural imports.

The trade flows between the EU and the Southern Mediterranean countries are in favour of the former. The main farm products sold by the EU to the Mediterranean

Third Countries are those which are in surplus and which benefit from export refunds (cereals, dairy products, sugar and meat), whereas imports are mostly fruits and vegetables, textiles and olive oil.

In the third countries the population growth rates are higher than in the EU Mediterranean countries. This trend, framed in a basically static economy, where agriculture plays a greater role than in Europe, leads to a growing supply of labour that favours the migration flows towards the towns or towards the Northern shore of the Mediterranean, and causes a strong human pressure on land.

3.2.2 The organic agri-food system

The history, the experiences and the dynamics of evolution on the application of organic farming method between the Northern and Southern-Eastern countries shores are different from each other. The identification of sustainable forms of land use is therefore a primary goal to be pursued for the purpose of reducing the degradation of primary resources, the ruin of rural environment and of biodiversity. The soil management through the organic farming method can be a model responding to the sustainable development need. However, the application of this production method necessitates additional knowledge on the technical, agronomic, legislative and market issues, to be able to produce and sell on the market, in compliance with the rules imposed by the certification and inspection system. Lastly, the lack or sometimes the inadequacy of policies has further slowed down the application of this production method in the Southern Mediterranean countries.

During the first International Seminar on Organic Farming, held in Acireale, Catania (Italy) in May 1997, it came out that it is necessary to envisage organic farming as a tool for the sustainable development of agriculture in the Southern Mediterranean region (De Castro, 1999). On the occasion of the International Symposium on organic farming in the Mediterranean, held in Agadir (Morocco) in October 2001, it has been stressed that the development of the sector needs to be supported by various actions including (i) the introduction of specific rules for the control and certification in the Southern Mediterranean countries; (ii) the training of technicians; (iii) the extension service and the spread of information; (iv) the strengthening of research and (v) the development of markets, in particular the local one. The Symposium has also given the opportunity to know the state of the art on the production, the problems and developments of the sector, so as to view

organic farming as a method able to contribute to the safeguard of natural resources and, at the same time, as a production technique able to meet the current production requirements without jeopardising the possibility for future generations to equally meet their needs (Hanafi and Kenny 2001).

Based on the data collected in the Mediterranean region by MOAN, there are about two million hectares under organic farming (CIHEAM-IAMB. MOAN, 2001). The farms that have adopted this new production method amount to more than 100 000 (table 2).

Over half of organic farms and surface areas is in Italy, which is the country that has given the most positive response to the introduction of this new production method.

The Southern Mediterranean countries, that have recently started up the organic production, have been stimulated by two factors: (i) the progressive interest of the European marketing farms that have moved more and more to the South to meet the growing demand for products of the North-European consumers and (ii) the interest for new commercial opportunities identified by local producers.

Actually, over the last few years organic farming in the South has been very vital, as shown by the strong growing trend of surface areas, originated undoubtedly by market phenomena but also by the evolution of the local agricultural policies, increasingly sensitive to environmental sustainability and production upgrading. In particular, the country with the highest organically grown area is Turkey, followed by Tunisia and Morocco (table 2).

The relative weight of the Southern Mediterranean countries with respect to the whole Mediterranean region is still low (figure 4), but the growth rates experienced, over the last few years, by some of these countries suggest a fast and considerable development of the sector.

4. Mediterranean organic agriculture: some major agronomic features

The model of agricultural development, still applied at present day, refers to intensive, specialised and highly-yielding agriculture largely based on the use of new technologies.

For a long time the effects on the environment and natural resources stemming from the application of this production model have been underrated or disregarded since attention

was paid to other objectives (food self-sufficiency and economic income).

In the second half of last century, research and agricultural policy that had backed up this development model changed radically the agroecosystems oversimplifying the food chains in order to get the highest yield. This approach paved the way to an increasingly frequent application of external inputs (plant protection products, fertilisers and energy inputs) thereby endangering natural resources.

Over the last years the European and worldwide scenarios have profoundly changed: food self-sufficiency is a problem of resource allocation and not one of production intensification since several countries are confronted with surplus management. Furthermore, the demand for healthy and high-quality products is rising jointly with the increasing awareness on the limits of natural resources.

New productive models outcrop; they are based on the sustainable development of the rural area within which agriculture plays a new strategic role.

The concept of sustainability in the exploitation of natural resources is strongly ambiguous despite its excessive use in the political domain and scientific research.

To date, the most accredited benchmark is the definition provided by the Bruntland Commission (World Commission on Environment and Development, 1987) which features the clear-cut concern for the progressive and sometimes irreversible degradation of natural resources in the poorest countries. The Commission analysis focuses on two key issues: the first concerning the responsibility of today's generation towards future generations while the second brings up the replaceability of natural resources with other forms of capital (physical and social investments).

These concepts encompass ethical elements and highlight problems related to the long-term impact of current actions.

The fragility of the system is more and more recognized. Like all the ecological, anthropogenic systems depending on energy inputs, it shows reduced self-regulation ability.

The ecological fragility of agrarian landscape is substantiated by the susceptibility of Southern European

countries and of the poorest areas to degradation processes referred to as desertification.

One of the clearest aspects of environmental degradation is the increasing desertification of soils leading to social migration and cultural impoverishment.

The soil is more than a mere interface between sub-aerial and underground environment and is strongly impacted by the changes in man-nature relationship.

The soil may be degraded by salification, laterization and erosion; it may be enriched or depleted by agricultural and animal husbandry practices thereby leading to wealth or poverty.

According to the FAO (2000), thirteen billion hectares are available in the world for cultivation of which only 1.4 are devoted to agriculture. In Europe, the best area in climatic terms, 145 million hectares can be cultivated equalling 29.4% of the world total. In Africa only 214 out of 3031 million hectares are cultivable (including prairies and the use of pastures by nomads), equal to 7.1% of the total value. And this situation gets worse and worse. In Germany annual losses of arable land total up to 10-12 tons per hectare, five to 10 times higher than the new soil that forms which corresponds to one to two tons/ha/year. Erosion alone points up that the present-day use of soil is untenable.

Among the strategies proposed in the field of sustainable development for the conservation and protection of the environment, just a few show operational instruments which can deeply impact on the whole system and enhance its greatest wealth: complexity.

This represents the ideal condition to overcome both the approach of natural resources conservation and that of productive exasperation in favour of the integration between the short to medium term economic needs of farmers and the medium to long term ecological requirements of society. The sustainable development of the territory requires the joint implementation of both actions: the application of low-impact production methods and the maintenance and functional rehabilitation of natural resources.

This implies the application of agricultural models based on the enhancement of natural resources in order to minimise dependence on external inputs: sustainable development model.

Following the definitions provided by the Organization for Economic Cooperation and Development (1992), agriculture is sustainable if it guarantees the sustainability of resources, of human health and economic aspects.

In particular, it shall ensure:

- the conservation of environmental equilibrium so as to guarantee an endless productive activity; it shall not cause any reduction or loss of energy or renewable materials (resource sustainability);
- safety for farmers and consumers' health through a production which is sustainable for human health;
- economically convenient production and a satisfactory yield for farmers (economic sustainability).

In the early 90s, the EU recognised the organic production method by issuing norms and designating it as an element of a broader strategy for the productive and environmental re-equilibrium of agriculture and consumer's protection (Regulation EEC 2092/91 and amendments). The United Nations, in a recent report of the UNCTAD Secretary (United Nations Conference on Trade and Development - 1996) maintain that organic agriculture can contribute to development and ensure the improvement of the environment, people's income and food safety.

The same source underlines the importance of the organic production method since it represents a credible and reliable system of regulations and certification unlike other methods of sustainable agriculture (integrated management, low input), whose standards are too diverse; difficulty in certification originates confusion and lack of transparency towards consumers.

For these reasons the organic production method can become an important frame of reference.

4.1 Major agronomic problems of Mediterranean organic farming

The Mediterranean organic farming experiences all the problems affecting the whole agricultural sector in general, besides some peculiar difficulties related to different factors and causes (traditional, cultural, economic and vocational).

In particular, other weaknesses of the traditional agricultural sector are related to:

- the introduction of new varieties more sensitive to the influence of biotic and abiotic factors;

- the simplification of rotations due to merely commercial reasons and to the distinction of "agriculture" from "livestock farming";
- greenhouse growing which favours and increases the plant sensitivity period;
- the excess of mineral fertilisers, notably nitrogen, that makes plants more sensitive to fungal diseases and pests;
- the increase in plant density which reduces light interception and extends the period of moisture persistence on the leaves;
- the increase in the growing area with a subsequent reduction of the space devoted to the shelters for the beneficial fauna;
- the development of pathogens' resistance to insecticides, herbicides and fungicides;
- the modifications induced by some pesticides on plant physiology, which induce a greater plant sensitivity to pest attacks and diseases;
- poor or no use of organic fertilisers;
- the globalisation: the increase in the number of plant and animal exchanges has contributed to favour global contamination, thus, becoming a major source of infection.

An issue that cannot be overlooked is water resource management: water is a renewable resource but it is very rare in the Mediterranean area. Agriculture is actually competing for water with non-agricultural sectors that are more profitable; moreover, intensive rainy periods are followed by long drought periods. A large fraction of rainwater is subject to surface runoff and therefore it is not usable by plants; actually, water infiltration in the soil is made difficult by ordinary agricultural practices, deforestation and the abandonment of livestock farming!

There is an additional aspect to consider: the Mediterranean area has historically shown a gap in the technical-scientific knowledge on the behaviour of the agro-ecosystem and its self-regulating capacity, which is crucial to develop a production method mostly designed to create an environmentally sound and human-friendly agro-ecological system, based on the use of local or farm renewable resources, on the management of ecological and biological processes with no or minimum dependence from off-farm inputs.

As to this objective there is a problem of adjustment of the present international and European regulations, considering the peculiarities of the Mediterranean areas.

Indeed, all the rules on the organic production method (Rush-Muller, bio-dynamic, Lemaire, IFOAM standards and EEC Regulations) have been historically set out in Northern Europe and do not take into account the specific features of the Mediterranean environment. This sometimes, originates application or interpretation problems.

Based on the above, it seems necessary to define the major technical principles for the Mediterranean region that may be summarised as follows:

a) soil fertility improvement. This necessitates an organic fertilisation, making use of farm and local resources. The use of technical inputs is allowed only if it is strictly necessary;

b) phytosanitary control based on the prevention and improvement of the agroecosystem self-regulating capacity. Treatments may be applied only in extreme cases using the authorised products;

c) weed control through cultural practices and mechanical actions;

d) holistic view of the farm and of the land system: it can lead to the farmer ability to observe the agroecosystem dynamics with a view to minimise any interference and interact making it as self-sustainable as possible. This means that it is necessary to guarantee the highest structural and genetic complexity that is known as biodiversity.

4.1.1 Soil fertility management

For the enhancement of soil fertility in Mediterranean climate, first of all it is necessary:

- to develop a greater awareness of soil potentials and envisage the possible solutions to improve its fertility (in physical, chemical and microbiological terms);
- to recycle all organic materials: their decay causes the progressive release of the fertilisers they contain; this results in a natural fractionation of applications. (In table 3 are reported some examples of compostable crop residues in Apulia Region);
- to never burn the organic matter (crop residues and others), that is often done by the farmers in the Mediterranean area.

Among the natural resources, one of the most valuable is the soil. This is a non-renewable resource in the short medium run which is unfortunately depleting, in particular in some areas where the trend towards desertification is more and more evident.

Forms of intensive farming have so far caused a great impoverishment of the land resource, notably in terms of organic fertility, one of the most important aspects often overlooked, for superficiality or due to specified interests (chemical and pharmaceutical industry). Organic farming, that makes no use of synthetic chemicals both for crop protection and for soil fertility management, is a productive model that is intended to recover and upgrade farm and local resources.

For instance, in Europe through the Regulation EEC no. 1488/97, besides the use of composted manure and animal dejection, that are deficient in the Mediterranean environment, the possibility to use the compost derived from domestic waste has also been introduced: this closes in some way, the "organic matter and nutrient cycle", so as to re-use on the land at least a part of the organic matter the land actually has supplied to the towns. Nevertheless, despite all the beneficial aspects, it could be used only till 2002 and only after the Certification Body has recognised its necessity. Since it is a soil conditioner, nearly all soils can benefit from it, especially in the Mediterranean countries.

This is certainly an innovation that encounters, however, many limitations in different countries.

The first is that the domestic waste for composting should be separated at the source (that is at consumers' houses); the second limitation is the heavy metal concentrations, which should be very low and which cannot be easily obtained through the currently composting procedures.

Still nowadays, at the farm level it is possible to use compost and provide composting obtained from "in-farm" matrices. Within the farm, there are many usable biomasses, which have been discarded and removed in different ways. These include: the pruning residues of tree crops, the crop residues of herbaceous crops and the residues of animal origin.

In addition, there are the biomasses which are found in the farm site: urban green residues, agro-industrial residues etc.

This enables implementing the concept of "closed-cycle farm", in which it is possible to produce and re-integrate without necessarily using off-farm energy inputs.

This concept is in conflict with the present reality, which is represented by small-sized and scattered farms. Nevertheless, this old but still valid agronomic concept may be recovered considering that the farm is not a separate system but it is closely related to the whole land system.

This is further confirmed by annex I of Regulation EEC no. 2092/91:

"The fertility and the biological activity of the soil should be maintained or increased, in appropriate cases, through:

- the cultivation of legumes, green manure or deep-rooting plants in a multiannual rotation programme;
- burying of manure from organic livestock farming;
- the incorporation of other organic material, either composted or not, from holdings producing according to organic methods."

4.1.1.a The cultivation of legumes, green manure or deep-rooting plants in a multiannual rotation programme

The actions carried out on soil fertility vary depending on the legume species (either for forage or grain, table 4), the amount of plant material that is returned to the soil, and the soil and climatic conditions.

4.1.1.b Burying of manure from organic livestock farming

By manure, or dung, we mean the fertiliser being produced from the fermentation of solid and liquid faeces of the animals reared in the stable or on the litter, formed by the various plant materials placed on the floor where animals live.

The main fertilising properties of manure are just resulting from the simultaneous fermentation of two different organic materials, the animal faeces and the litter vegetables. The composition and the physical, chemical and biologic properties of manure vary a lot, and depend both on the characteristics of the dung and litter, and on the processes of fermentation that have occurred. In general we can say that the manure of horses and sheep is quite dry and rich in nutrients and it develops much heat during fermentation; that of pigs, which is quite rare, is usually aqueous and is generally the least valuable. The

cowshed manure has intermediate characteristics and is the most largely used; it is actually considered as "the manure" par excellence.

Also from a chemical point of view, the manure is made up of many organic substances deeply different from those that are found in the origin materials, or the excrements and the litter plant materials. Many of these substances are quite complex and stable and, once they reach the soil, they enable the formation of structural humus, thus increasing the soil organic matter content. The manure also includes all the nutrients that are essential for plant life.

The ECC regulations on organic farming prescribe that manure should be derived only from extensive livestock farming.

4.1.1.c The incorporation of other organic material, either composted or not, from holdings producing according to organic methods

Green manure, for instance, is a very helpful means to fertilise soils in the best way, also in hot-arid countries, independently of the availability of manure and compost.

The green manure cropping of legumes, in particular:

- transfers - through nitrogen fixation - the nitrogen from the atmosphere to the soil (it normally supplies 50-60 kg/ha);
- favours the activity of the soil beneficial microflora, by supplying nitrogen;
- makes soil fertility available to the subsequent crops, by solubilising and bringing to the surface major nutrients like phosphorus and potassium;
- may be useful to correct alkali or saline soils that have been damaged, for example, by irrigation with brackish water (greater effect than manure).

As to the compost intended for organic farming, instead, it is one of the most frequent items in annex II A to Regulation EEC no. 2092/91 (as subsequently modified), since it includes different products usable for soil conditioning, such as (i) composted animal excreta, including poultry dung and manure; (ii) domestic waste transformed into compost (iii) mixture of plant materials and composted barks and (iv) the excreta of worms (vermicompost) and insects.

4.1.1.d The integration with other organic or mineral authorised fertilisers is allowed only exceptionally. A useful reference could be Annex II to Regulation EEC no. 2092/91.

4.1.2 Phytosanitary control

The human action involving the use of high impact cultural practices causes imbalances in agricultural ecosystems. One of the most evident signs of these alterations is the intensification of pest attacks and fungal diseases.

The organic production method is generally based on the re-establishment of a high environmental diversity that is given by the relation between the number of species and the number of individuals for each species.

This model, which is poorly relevant when applied to one or few species, is one of the concrete possibilities of biocenosis analysis, for the control of organisms that can turn from hosts into harmful and/or dangerous organisms only under certain conditions.

These conditions are basically related to the interactions plant-environment-pest.

The deep knowledge of these interactions can enable adopting the best choices and limiting the use of the technical means, however authorised, in order to face situations that can seriously jeopardise the production and income.

Pest control in organic farming rely principally on pest knowledge, monitoring and prevention. At maximum extent, direct control should be done according to regulations.

4.1.2.a Pest knowledge and monitoring

Each crop in a given environment may be exposed to one or several pests, which compromise its productivity. Efforts should be made in order to know the development of the key pests and of their natural enemies. According to the pest, a specific methodology may be applied with a view to monitoring its development and predicting its damages.

For insects, monitoring is performed through traps, which detect their presence in the field. Sampling to determine the plant pest population and its potential harmfulness by comparing values on the basis of the economic threshold follows monitoring. The economic threshold represents the plant pest population, which may induce economically

relevant damages on the crop. In organic farming, the economic threshold value shall consider the low efficacy of technical means and the ability of antagonists to limit the plant pest development.

For pathogens, the concept of economic threshold is not applicable because of their rate of development and limited curative action of the technical means authorised. Predictive criteria are envisioned considering climatic and phenological conditions. For some fungi (and a few plant pests) predictive models are being developed.

Predictive models of the biotic potential are based on abiotic and biotic data.

Abiotic data

Climate: relative humidity (R.H.) and temperature (in terms of absolute value, thermal build-up and/or degree/day) are the key elements for predicting the biotic potential of a species.

Soil: soil nature (structure, reaction etc.) provides information on the possible development of soil-borne organisms, which can turn into harmful organisms under given conditions.

Biotic data

Are based on the preventive control of the plant pest or pathogen so as to ensure timely decisions for their control.

4.1.2.b Prevention

Prevention is undoubtedly the best practice for the correct application of the organic production method. It shall maintain a permanent state of tolerance or resistance of plants to diseases and insects. The limited presence of pests and pathogens in the field is a normal condition; an excessive pest increase results from the alteration of biological equilibrium.

In this strategy the farmer shall adopt preventive techniques in order to achieve the best result.

Prevention techniques are numerous; it is up to the farmer to evaluate what may be applied according to the farm:

- use of healthy material;
- preventing the introduction of the inoculum;
- inoculum reduction;
- inoculum eradication;

- use of resistant varieties;
- shifting the cropping period;
- promoting the crop aeration;
- rational nutrition;
- use of aphid-proof nets;
- promoting beneficial insects;
- other agronomic practices (crop rotations, solarisation and soil tillage).

4.1.2.c Direct control

Direct control under organic farming integrates several methodologies; the application of the technical means admitted is subject to real needs in order to limit damages on production and/or plants.

Control strategies are direct against insects. They are as follows:

4.1.2.c.A - Use of reared beneficial insects

Studies on the pest and fungi antagonists have led to the identification of beneficial insects, nematodes, fungi, viruses, bacteria, rickettsiae, mycoplasmas and protozoans that jeopardise the development of crops pathogens.

For some of them, biofactories apply commercial rearing techniques. At present, the Italian market sells great many beneficial insects such as the bacterium *Bacillus thuringiensis* against lepidoptera (and recently against beetles), as well as mites and nematodes.

The use of reared insects may be designed to increase the populations already present in the field or to anticipate their settlement (inoculative releases). Large amounts of these insects may be released in protected areas like greenhouses (inundative releases) to combat the pest. The release technique and the conditions to achieve the best results are specific for the beneficial insect.

4.1.2.c.B - Mass trapping

Mass trapping in large areas through specific traps can help reducing the plant pest population and suppressing the damages induced. Mass trapping is applied in closed environments such as warehouses and greenhouses. In warehouses males' eradication with pheromone traps is applicable against food moths; the population drops down to harmless levels. In greenhouse, chromotropic traps are applied in large quantities in order to combat white flies.

In some open field conditions, mass trapping is applied against the olive fly and forest plant pests.

4.1.2.c.C - Mating disruption

Mating disruption is based on the diffusion of a constant quantity of synthetic pheromone in the orchard so that males are unable to locate females.

4.1.2.c.D - Use of technical means

In organic farming the use of technical means is the last remedy that helps preventing damages on plants or production. Even though a very few products are authorised, generally of natural origin and with use restrictions, their application has an impact on the environment.

Annex I of EEC Regulation 2092/91 envisions the application of technical means only when they are strictly necessary:

"...Pests, diseases and weeds shall be controlled by a combination of the following measures:

- choice of appropriate species and varieties;
- appropriate rotation programme;
- mechanical cultivation procedures;
- protection of natural enemies of pests through provisions favourable to them (e.g. hedges, nesting sites, release of predators);
- flame weeding.

Only in cases of immediate threat to the crop may recourse be had to products referred to in Annex II of the EEC Regulation 2092/91. "

With reference to the EEC Regulation, the authorised products useful for crops under Mediterranean conditions are a few. Furthermore, the use of the very few specific products is rather controversial. Synthetic pyrethroids, which may be used in traps against the olive fly and Mediterranean fruit fly, are a worrying example because for the first time the use of a synthetic substance is authorized.

The major concern bound to restrictions for Mediterranean productions is the time limit of copper that may be used till 2002. Its exclusion or radical reduction can compromise the application of the organic production method to most Mediterranean crops since specific research is not available for the identification of valid alternatives.

Another substantial contradiction outcrops from the annex: the use of ethylene for bananas. Why isn't it allowed also for other crops such as citrus and kiwi?

4.1.3 Weed control through cultural practices and mechanical means

The basic and innovative element for weed management in organic farming is the approach by which weeds represent a resource to be enhanced or controlled according to the pedoclimatic and cropping conditions (crop interference, seasonal pattern, type of weeds etc.) and not an enemy to destroy.

The structure and dynamics of weeds are ruled by the productive system, since the cultivation of a species implies a different equilibrium. The cropping system, the definition of the weed critical period and alternative control methods are the factors which may help rationalise the weed management.

For the optimisation of the organic matter balance in the soil, conservative tillage is advisable in organic farming. This approach may be criticised for the risk of reducing the levels of production and increasing perennial weeds. Studies conducted in the USA and in the Mediterranean conditions have showed that the productive levels of both systems are comparable and that the levels of infestation do not increase with minimum tillage techniques thanks to allelopathic substances.

Identification of the critical weed period is crucial for the definition of control strategies. In the Mediterranean fruit cropping systems, this period corresponds to the months in which crops suffer from water stress whereas competition for nutrients is balanced. The ground cover in the rainy period is strategic for reducing erosion especially in hilly areas. The biomass production during this period is fruitful for the system and allows reducing the loss of nutrients by leaching (N in particular) and mobilising less mobile elements from deep layers (P in particular).

Alternative control methods are the use of green manure, cover crops and, when possible, the adoption of biological control techniques.

There exist some experience on the use of alternative techniques such as flame weeding and the adoption of lenses for sun radiation reflection that inactivate the soil. Flame weeding is not agronomically or economically convenient in the Mediterranean orchards whereas good

results are attained for some vegetable crops. Experimental data are still insufficient.

It is therefore mandatory to analyse all the practices applied and to combine the various options as a function of the pedoclimatic and cropping conditions. This requests the knowledge of the weed community structure and of the characteristics of the individual species. The organic farmer shall acquire the knowledge on the biology of the key species. Therefore it is often necessary to resort to mechanical means (mowing and/or tillage) to regulate the seed production of different species.

The competition between weeds and vegetable crops is always strong for nutrients and water which is a limiting factor in southern areas. This explains why weeds can harm crops if their growth is not held back.

Other damages result from the shadowing of the crop by weeds. *Convolvulus arvensis* L. can twine itself round the stems of plants hampering the light penetration and jeopardising the right growth of the plant.

The problem is deeply felt for slow-growing crops which are small in size and widely spaced between the rows. Wide spacing is diffused with organically-grown horticultural crops in order to respect the natural potential of soil in terms of water and nutritional resources.

Despite the above considerations, weeds are not to be completely destroyed in the field.

The controlled presence of weeds can be useful in several cases since it may directly or indirectly help pursue the main aim of organic farming: the creation of an on-farm agroecosystem which is stable and complex.

Mild weeds exert a certain competition towards harmful weeds; they attract some pests, favour the development of beneficial insects, protect the soil from erosion and from leaching of the most soluble mineral elements.

Control shall apply to the most competitive weeds which may compete with the crops grown and/or with those interspersed in the crop rotation. Each crop has harmful weeds and others whose competition is milder or emerge later when the crop has completed its productive cycle. As for early potato, *Convolvulus arvensis*, a very competitive weed, develops only at the end of the productive cycle of the cultivated plant inducing a lower qualitative and quantitative damage. Weeds are to be controlled in the critical competition period between the beginning and the

end of cropping. The duration of the control critical point (CCP) depends on the crop. In lettuce, vegetables, onion and garlic the critical competition period is rather long; as to zucchini, eggplant, tomato and other fast-growing crops with a large canopy, sensitivity to weeds is short.

Attention must be paid to species which may host viruses and bacteria.

Techniques for curbing the development of weeds in vegetable crops are preventive (when they increase the natural crop competitiveness) or direct (when they act directly on the weed development).

A wrap-up is proposed about some agronomic techniques with reference to their impact on the crop/weed relationship and the choice to make.

a) Preventive techniques

Practices which allow the crop to grow and cover the soil in the shortest lapse of time and to compete with weeds.

A rational planting technique can help limiting the infestation in the field.

The major factors are:

- sowing or transplanting period;
- mode of sowing or of transplanting;
- choice of cultivar;
- crop rotation;
- soil tillage.

b) Direct techniques

Techniques which impact the weed development such as:

- false sowing;
- mechanical operations;
- thermal weeding;
- mulching;
- solarisation;
- irrigation.

4.1.4 Agroecosystem complexity and its self-regulation:

a holistic approach

The organic farmer shall optimise his cropping choices by analysing the agronomic and economic aspects peculiar to the crop and the features of the on-farm agroecosystem.

Attention shall be paid to the cropping system and to the entire on-farm and land agroecosystem.

Viewing the farm as agroecosystem offers information on its internal organisation and economic choices and its external relations.

The agroecosystem analysis is designed to optimise the system properties (productivity, stability, sustainability and self-regulation) since the system is not a mere summation of its individual components (holistic approach).

The first step is to implement an agroecosystem which is both productive and protective of the environment, energy saving, healthy, producing quality food free from synthetic chemicals (health quality).

The objective is to have an autonomous on-farm agroecosystem close to the model of natural systems in which a high biodiversity corresponds to a greater stability and productive capacity.

In practice, such a model may be achieved through the implementation of a complex system of interventions aiming at:

- securing a high level of self-maintenance and maintaining the soil fertility. Soil conservation is linked with the control of the water cycle, plot layout, tillage and crop choice which have a repercussion on the cover of the soil;
- guaranteeing a higher structural and genetic complexity; and this through the rehabilitation of biodiversity, processes of plant naturalisation and recovery of the landscape;
- reducing the susceptibility to weeds through the use of varieties fit for the environment in order to enhance the intrinsic ability of the plant (productivity, development and resistance to plant diseases);
- optimising the use of native resources (rainfall water, atmospheric nitrogen, soil organic matter and sun radiation);
- introducing the recycling of the on-farm organic material, recovery and enhancement of the biomasses in order to close the natural biological cycles;
- reducing the use of complementary energy (reducing tillage, the use of pesticides and fertilisers although authorised in organic farming).

A preliminary condition for the right application of the organic method is the knowledge of one's own farm and of

the surrounding area. By observing the individual elements and their interaction, it is possible to choose the crops which allow to produce in harmony with the ideal agroecosystem.

The biodiversity conservation on the organic farm requires a great awareness of the farmer since his actions are ecological factors. The compliance with the ecological laws regulating the complex relationships between living beings and their environment is achieved by knowing the limits that must be respected (excessive use of fertilisers and pesticides).

The correct and responsible application of the organic farming method, whose technical-agronomic basics are the self-regulation of agroecosystems, represents per se a valid instrument of biodiversity conservation.

The more complex the system structure i.e. the higher the biological richness in terms of number of species, the better the homeostatic ability of an ecosystem.

The management of biodiversity is influenced by the cropping choices and by the organisation of productive systems (rotations and crop associations) in space and time. Through them some measures may be taken such as:

- Conservation, compositional and structural improvement of plants of natural origin on the farm (hedges, woods, windbreaks, riparian plants and of water stretches, old trees with cavities and desiccated parts) and/or their introduction with native species. These are shelter areas for the natural enemies of crop pests and are useful to favour the presence of pollinators. These plants are elements of biological connection between the farm and the region it belongs to (on-farm integrated ecological nets).

- Reduction of the space continuity among crops of the same type and reduction of the genetic and phenological uniformity with an indirect control of plant pests and weeds.

- Higher presence of different habitats with a consequential increase in the number of species and cultivars and wild varieties (a more complex food chain).

- Creation of ecological social niches which find a limited use in conventional agriculture and consequential limitation of specific and varietal erosion.

The management of biodiversity within the farm and at the agroecosystem level is based on agronomic practices and operations which contribute to reducing energy inputs and

external substances. These practices and operations are related to the management of water resource, of soil fertility, of weeds and pest control.

In practical terms, the Mediterranean organic farmer, in order to make cropping choices enabling him to produce, to manage the soil correctly and to rehabilitate the ideal agroecosystem, shall:

On-farm management

- establish or recover hedges and trees to shelter the entomofauna;
- use plant protection products and fertilisers as referred to in annex A and B of the Regulation EEC 2092/91 (and its amendments) in the right dose and at the right time;
- use biological control;
- use mowing for the weed control;
- reduce the number and depth of soil tillage;
- prevent erosion (limiting the period of fallow, refraining from deep tillage and using windbreaks);
- enter plots only under suitable conditions;
- carry out the ground cover of orchards;

Land management

- preserve the natural vegetation;
- preserve the riparian vegetation along water stretches;
- preserve and promote trees, hedges and headland;
- use native plant species useful for the farm management as hedges;
- create shelters for vertebrates.

The conservation and rehabilitation of biodiversity imply: a greater stability of the agroecosystem, lower use of external inputs (pesticides and fertilisers) and higher productions in quantity and quality.

5. The market

Organic products are being increasingly traded internationally. The market share is modest but trends indicate that there is an enormous potential for expansion. The ever-growing number of health conscious and environmentally concerned consumers is at the root of this development along with the huge efforts supermarkets have

put into marketing organic products and energetically promoting their consumption.

In the year 2000 the International Trade Centre UNCTAD/WTO (ITC, 2001, table 5) estimated that the global organic market was worth almost US\$ 17.5 billion, accounting for 1-2% of the total food market and predicted a two digit growth rate of 10-25% on an annual basis in the various countries. In Europe, Germany is the leading organic market, followed by the UK and Italy.

Also the FAO (1999) has predicted a sustained growth of organic produce. The annual growth rate ranges between 10% and 25% depending on the markets. The sale of organics is predicted to climb from 1% to 10% in the years ahead. The organic trade gap across the world is due to the mismatch between soaring demand and scarce supply.

In a number of less developed countries a domestic market for organic produce is in the making, though at a decidedly staggering pace. The ITC survey has indicated that there are opportunities for less developed countries to market organic produce in Europe and in North America, mainly those products which cannot be grown locally, such as coffee, tea, cocoa, spices, tropical fruits, vegetables and citrus.

As far as distribution is concerned, the role of the various marketing channels for organic produce varies widely from a country to another. A recent European survey of marketing channels (Michelsen, 2000) has highlighted that retail outlets have become dominant in a number of countries (Portugal, Sweden, Denmark, Finland, Austria and Switzerland). Specialist organic retail outlets are prevailing in the Netherlands, Greece, Italy and Belgium, whereas direct marketing stands at 30% in Greece and Luxembourg (table 6).

However, the survey does not take into account the increasingly pivotal role of the major organised retailing and distribution chain. In Italy, the organized outlets which sell organic fruit and vegetables and the like have climbed from 130 in 1996 to 1340 in the year 2000.

The soaring global demand for organic products and the stepped up international efforts made to harmonise the guidelines and regulations governing organic farming will undoubtedly contribute to expanding the acreage of organically cultivated land and boosting the market for organic products in the years ahead, as confirmed by the

mounting interest shown by governments and the unequivocal support provided by the UN and FAO.

Countries like New Zealand, Israel and Argentina are already exporting to those countries where demand outstrips supply. The current trend of organic agriculture across the world indicates a more sustained growth rate and an increase in the organic acreage in the countries with the vastest markets, except for Japan. The countries with the broadest markets are the leading producers, but there is an enormous potential for export in a plethora of minor countries, mainly developing countries. In the face of mounting market globalisation a whole host of problems crop up. Organic farming is not to be regarded as an alternative to long transportation of goods around the globe. The guidelines do not focus on local marketing, nor on seasonal supply of produce. Granted that in the near future organic products will be sold in supermarkets in many countries, organic farming is also expected to meet the local and regional demand for healthy food. Hence, there is scope for lively international trade as industrial countries cannot grow any coffee, nor bananas. Balanced and fair trade remains the key to ensure food security and safety and boost environmentally-friendly growing and eating habits.

5.1 The market along the southern and eastern shore

In the South-eastern Mediterranean countries the consumption of organic food is in its infancy with the exception of Egypt where organic products are sold in more than 7000 pharmacies and 3000 shops (Geier, 2001). In some capital cities shops and supermarkets have started to sell organics, but the local community is neither informed nor aware of the existence of these products (MOAN, 2001). Domestic markets and export potential differ markedly from country to country.

In Albania (Ferruni, 2001), agriculture has undergone radical changes over the past decade. The State farms averaging some thousand hectares each have been fragmented into small farms of 1-2 ha in size. The current economic recession does not allow for fresh investments nor for the purchasing of machinery or chemicals which are imported at sky-high prices. Except for a few farms which make use of synthetic chemicals, the vast majority of farms adopt a method of production which can be generally regarded as "organic". Hence, Albania is a breeding ground for organic farming as the country can capitalise on the experience gained in the use of chemical-free production methods. In June 1997 the Organic Agriculture Association was founded

by some Albanian producers and researchers. In 1999 the first specialist organic retail outlet was opened in Tirana and over the past two years a number of projects have been initiated and partnerships have been forged between Albanian and European scientific institutions to give renewed impetus to the organic sector.

In Egypt (El-Araby, 2001), organic produce certification schemes were first introduced twenty years ago to meet the requirements of foreign importers of medicinal plants. Over the years the production has expanded to embrace fruit and vegetables and cotton intended for the European market. The lack of a national regulation has not hampered marketing as certificates are issued by six certifying bodies most of which in the importing countries. In the future, following the completion of the free trade zone and the expansion of the local market, this regulatory gap may become a stumbling block. Egypt markets organic produce in the UK, Germany and Italy (Abou Hadid, 2001). In Israel (Adler, 2001), despite the limited arable land, organic production is well developed and fostered by research activities carried out by some local Universities. More than 7000 ha are currently organically cultivated, accounting for 1.25% of the arable land and the annual growth rate stands at approximately 25%. Organic products comprise: greenhouse-grown vegetables (100 ha), citrus (410 ha), fruit trees (830 ha), field crops, such as carrots, potatoes, tomatoes for industrial processing and cereals (5100 ha), minor and nursery-grown crops (560 ha) and livestock production. The total organic sector is worth US \$ 180 million, 30% of which are marketed locally whereas the remainder are exported. Twenty years ago the Israeli Bio Organic Agriculture Association (IBOAA) was established to train new producers and ensure inspection and certification.

In Lebanon (Estephan, 2001), environmental concerns and health awareness have contributed to strengthening the organic sector. The acreage devoted to organic production amounts to 160 ha (17 producers) and some more 90 ha are under conversion. However, the local market potential is not sufficient to fuel the expansion of the sector which remains hampered by the lack of production standards required to implement a national regulatory framework. Recently, organic products have started to be sold in some supermarkets and in healthy food shops in Beirut as well as in some nearby towns, but it is hard to tell whether there is a revived interest amongst local consumers.

In Malta (Calleja, 2001), with a view to boosting organic farming and given the pending joining of the European Union, the Malta's Organic Agriculture Movement (MOAM) was founded in 1999. The mission of MOAM is to promote training and research, advocate standards and certification schemes, foster rural development, boost marketing and help local farmers to become familiar with the organic production method. MOAM also promotes organic produce within hotels, restaurants and catering services and actively campaigns to raise awareness among tourists and natives and encourage consumption.

In Morocco (Kenny and Hanafi, 2001), the early attempts at adopting the organic production method date back to 1986 when a citrus grower from the Marrakech region was spurred by some French producers to go organic. From 1992 onward the organic production method has spread across the country despite the lamentable lack of a national regulatory framework.

The estimated acreage under organic farming totals 11 956 ha, 35% of which under conversion (Kenny and Hanafi, 2001). More than 1400 ha are grown with vegetables and citrus. Some varieties of vegetables are grown under greenhouses so as to ensure out-of-season harvesting. The major organically cultivated crops are citrus, medicinal plants and argan trees for oil making. The argan tree is a typical Moroccan crop, similar to the olive tree, the fruits of which are harvested by the natives to extract oil. The argan oil, which again is similar to olive oil, is used for cooking and for making cosmetics. Over the past five years, Morocco has been the sole world's producer and exporter of organic argan oil.

Since there is no domestic market, the production is fully exported, mainly to Europe. Vegetables (especially tomatoes and cucumbers) and citrus account for 95% of the goods which are exported to France, the UK and Germany.

Over the past five years, Tunisia (Ben Kheder, 2001) has witnessed a sustained and fast-paced increase in the acreage and number of farms which have gone organic, from 10 farms over 300 ha in 1997 to 137 farms over about 15 thousand ha. Organic products comprise olive oil, dates, vegetables, fruits and honey. This growth is largely dependent on the expanding export opportunities and the huge efforts the state has put to back the organic sector. Tunisia is the southern Mediterranean country which has first transposed the regulation governing the inspection and certification of organic produce and has issued a law

on organic farming (Law no. 99-30, dated April 5, 1999). The Tunisian government has also recognised some foreign inspection and certifying bodies and a Tunisian body, INNORPI (Institut National de la Normalisation et de la Propriété Industrielle). A subsidy has also been envisioned and local farmers are reimbursed 70% of the inspection and certification expenses borne. In addition, the "Centre Technique de l'Agriculture Biologique" (CTAB) has been set up and a number of actions have been undertaken to help conversion and promote training. The local market is still in its infancy and a limited range of Tunisian organic produce is on sale in a few supermarkets in the capital city.

Turkey (Aksoy, 2001), with more than 26.7 million ha, is the Mediterranean country which has the vastest arable land available; it is one of the few countries in the world which has exceeded the food self-sufficiency threshold and is a leading exporter of agricultural products. The farming sector remains the major source of employment for 56% of the population and feeds the local industry. The current acreage devoted to organic production exceeds 40 thousand ha which encompass more than 12 thousand farms. Also in Turkey the spur to go organic has come from abroad. It started in the mid 1980s following an upsurge in demand by European importers. The early foodstuffs to be produced organically were dry fruits. Over the years, about one hundred products have been added to the list, including fruit juice and preserves, bakery products etc. In 1992 the Turkish Association of the Organic Agriculture Movement (ETO) was established to cater for the needs of the existing organic farms, set the standards for production, inspection, certification and export of organic produce and speed up the development of the sector. This Association, which groups researchers, farmers, distributors and consumers, provides training and counselling to farmers and serves as a link between dealers and institutions. A national regulation was enforced in 1994 in keeping with the EC regulatory framework. The Ministry of Agriculture has been entrusted to supervise the sector. The bulk of the domestic production is exported to the European Union (80%), especially to Germany (60%) and the USA (15%). The domestic market started to operate in 1999, mostly in the main towns. Marketing is generally confined to healthy food shops and supermarkets.

The country-based analysis has highlighted a flurry of interest for organics among producers who have realised the promising marketing opportunities on the leading markets. A

mounting interest in organic products is also sweeping among consumers across the Southern Mediterranean countries where it is safe to expect a local market boom. This is an enticing scenario which bolsters producers' confidence and encourages dealers and public institutions to keep a close eye on this flourishing sector.

6. Conclusive Remarks

Organic farming supplies the Mediterranean countries with a production system that focuses on strategic interests, not only for the single farm but also for the whole land system. It is not only a production method but rather an actual development model that integrates environmental, socio-economic and ethical aspects.

These interests are based on: the maintenance of soil fertility, biodiversity, the use of appropriate technologies, the proper use of water resources, the control or reduction of desertification, crop rotations and the diversification of products.

The model of sustainable agriculture development that encompasses organic farming differs from the Western model of intensive agriculture, whose damages to the environment and to the natural resources are still impossible to quantify in relation to the well-known economic benefits assessed following the conventional criteria of economic analysis.

Despite the progressive development of organic farming and the rising interest of the major international markets (USA, Japan and European Union) in this production method, the evolution of the organic production method in the Mediterranean region is constrained by some critical points.

First of all, many Southern Mediterranean countries still lack a regulatory framework on the organic production method. There are no reference national regulations regulating the certification and inspection systems of organic products and, in other Southern Mediterranean countries, the existing legislation necessitates an adjustment to the regulations in force at European and international levels.

There are still no co-ordinated measures to back up the development of Mediterranean organic farming: there are still few and occasional actions in the various sectors ranging from training and extension service to experimentation; there are no national or regional policies fostering, both directly and indirectly, the conversion of

farms to organic farming. Therefore, contrary to what has happened in Europe, organic agriculture is growing in the Mediterranean area only for market reasons, with a poor technical support, sometimes financed by the institutions.

Moreover, the Mediterranean region is also suffering for the great gap in the technical and scientific knowledge about the application of organic production method, which includes techniques developed in areas characterised by greatly different soil, climatic and cultural conditions. An additional constraint is the great difficulty to find out the technical means to be used or, where these are available, the poor technical knowledge on their use.

However, there is a common trend in the whole Mediterranean region towards the reconversion of the present agricultural productive systems into a more comprehensive sustainable development project, aiming at the growth and overall recovery of the rural space and tackling the aspects bearing a reference to environmental protection, animal welfare, consumers' behaviour, market development, quality of food products, regulations, certification and labelling.

Within this scenario, some strategic lines shall be set up for organic farming development in the Mediterranean region.

The primary task is develop locally a culture of organic farming relating not only to the production but also to the market, social and land-related issues.

Secondly, the adoption of a national legislation in each State is essential to harmonise the international rules in view of the mutual recognition of the regulations of different countries (principle of equivalence).

The EU has currently defined a system of equivalence with six countries (Argentina, Australia, Switzerland, Czech Republic, Hungary and Israel) included in the Annex to Regulation EEC no. 94/92, identifying for each of them the product categories and the bodies in charge of inspection and certification. In other instances, imports from a Third country are regulated by specific procedures in compliance with EEC Regulation no. 2092/91 (art. 11).

The ultimate goal is to institutionalise the certification and inspection system of organic farming method, that means defining a national regulatory system, where the State is in charge of supervising (via planning and co-ordination activities) the whole certification and inspection system on the production, processing and marketing of organic products.

In more general terms, in the Mediterranean region (EU and non-EU countries), it is necessary to set up a regulatory system which takes into account, in view of certification, the outcome of a farm in terms of environmental-friendliness and public health. At present, the certification is assigned to organic products by simply proving that no synthetic chemicals are applied, following a "minimalist" approach.

Moreover, it is also necessary to set out the rules for the application of basic standards unified at the Mediterranean level for organic products in order to define the basic guarantee requisites for consumers.

It is necessary to define a policy to support the establishment of organic producers' associations aimed at enhancing and concentrating the supply. It is therefore necessary to disseminate the technical knowledge on the organic production method in order to avoid production losses and to guarantee basic quality standards especially during the conversion period.

At the same time, the public institutions should take actions and start up programmes designed to enhance the production and national consumption. This would have great benefits for the public health and for the environment.

Part II

COUNTRY REPORTS

ALBANIA

Velesin Peçuli

University of Tirana

1. General aspects

Organic agriculture products have been firstly introduced in Albania by HIPP, the German producer of organic baby food. It has been promoting and selling basically organic foods in Albania since 1995. They have a good distribution system all over the country and operate basically with drug stores.

Oxfam - Novib support a very interesting project in Northern Albania in the region of Shllak to develop permaculture. (Permaculture is a dose relative to organic agriculture, with a strong orientation on farm planning and very diverse cropping. The objective is to produce sufficient amounts of diversified food in a small area). They have developed a good extension network in approximately 30 villages, elaborated interesting training modules and introduced numerous successful technical improvements (including water reservoirs, mulching and "Konfej" as fertilizer). In 1998, they created a resource centre (near Skodra) with the objective of creating a model farm according to permaculture. Even though the centre is not yet fully operational, they have been holding courses and demonstrations (train approximately 20 people a month) during the summer months. This project has supported the establishment of a co-operative for herbs, which tends to export under 'organic' label.

At least one private fresh herb producer and exporter "Aris-frucht" is certified by BIOSWISS and is exporting fresh herbs to Switzerland, since January 2001.

Two groups of women are certified by an Italian certification body as organic herb collectors in Zadrime, region in Lezha district. There are no data on exporting wild herbs.

Three bee-keepers have applied to the Organic Agriculture Association (OAA) to convert to organic, but OAA is not yet recognized as a certification body, neither by IFOAM nor by the Albanian government.

Some olive oil producers, members of OAA, are actually trying to enter the procedure for labeling 'organic' and thinking for exporting.

The OAA, whose objectives are the promotion of organic agriculture in Albania, is a young and dynamic association. It was established on June 1997. It has undertaken a number of interesting activities, all on voluntary basis, and has developed a strong membership among the agricultural experts. The Association is very conscious of the need to motivate more producers to become involved in organic production. Agricultural producers in three districts are members of the Association and are willing and capable to deliver organic goods if and when some infrastructure will be set up. However, efforts in contacting producers is limited because of the lack of resources.

The activities OAA has undertaken, especially efforts to present organic agriculture to a wider public, have created a lot of interest among both "intellectuals" and consumers. A local market, though small, does exist in Tirana for higher quality goods, for Albanian specialities and products, which can be easily traced to the producer.

OAA has established a commission for the certification of organic products based on the IFOAM basic standards.

OAA is now supporting the efforts of one of its members to improve the performance of a shop (natural and organic) in Tirana in which organic products can be sold.

Recently OAA has been appointed as Albanian coordinator for the project "Introduction of Organic Agriculture and Low Input Sustainable Agriculture in Balkan Countries", in the framework of Stability Pact.

From the government side, there are attempts to introduce organic agriculture in its policies. In the governmental strategy for agriculture "The Green Strategy" organic agriculture is considered as an alternative in rural areas, especially in the mountains.

2. Regulatory aspects

Actually, there is no legislation in the country concerning organic agriculture. The inspection and certification system in the country is managed by OAA, but it is still weak, since it is not associated with any national legislation or international scheme of inspection and certification.

3. Structural aspects

There is only one organic farm certified by BIOSWISS, Switzerland.

The farm's area is about 4 ha (two in the open field and two under green house). It is located in Gjokaj - Tirana. The main product is fresh herbs. The total production per year is around 20 tons. The turnover is around \$US 80 000 per year.

There are groups of farms in Lezha districts involved in wild collection of herbs and certified by an Italian association (not yet identified). Also, there is a herb cooperative called "Kiri 2" in Shllak Shkoder, which is collecting organic herbs (but not yet certified). Some training activities were organized, financed by the Ministry of Agriculture, the World Learning Program (USAID) and the Mediterranean Agronomic Institute of Bari.

4. Agronomic aspects

The main problem in soil fertility management is the lack of adequate drainage and irrigation systems.

The main issue in pest and weed control is the quality of pesticides and the lack of knowledge about their use.

The main authorized product for soil fertility is manure.

Imported propagating material is basically certified, but not necessary as organic. Propagating material in the country might be considered organic.

There are not local companies producing technical means.

5. Market aspects

There are no organic shops in Tirana and no organic products are sold in supermarkets. Products usually go to the foreign market such as Switzerland and Italy. About 20 tons of organic fresh herbs are exported to Switzerland per year.

Aris-frucht is the company that exports to Switzerland. There are some demands from German and British markets.

The main difficulty in exporting Albanian products is the lack of internationally recognized inspection and certification body.

Domestic consumption of certified organic products is not developed yet. Ten percent of people in remote rural areas consume non certified organic products (self producing and self consuming).

There are no evident forms for promoting organic products, apart from the organization of pavilions in national fairs by OAA.

6. Association

In Albania actually there is only one organic association, the OAA, which has branches in main districts of the country, and good membership (90 members). It has also continuous contacts with the Ministry of Agriculture and Food.

OAA address is Rruga Labinoti P 4 shk 3 ap 19 Tirana, ALBANIA.

Tel: +335 4 373182;

E-mail: lavdosh@icc-al.org.

ALGERIA

Abdelkader AÏSSAT

University of Blida

Introduction

Algerian agriculture includes the so-called "modern" and traditional production. At the contrary of the "modern" and intensive, the traditional production (70% of agricultural useful area) is characterized by a low level of mechanization and absence of fertilizers and pesticides.

Organic agriculture, as a system of production under legislation, does not exist yet.

This delay comes from the fact that the last thirty years, agriculture was not considered as a priority by the authorities and so, not encouraged as it has been done for industry.

1. Organic farming in Algeria: the beginnings

In the year 2000 the first attempts to introduce organic agriculture in Algeria started:

- Some lectures addressed to teachers and students of the National Institute of Agronomy (Algiers) and the Institute of Agronomy of Blida and to the executive staff of the Ministry of Agriculture were organized.
- A report about the importance of the development of organic farming in the country and its environmental and economic aspects was submitted to the Minister of agriculture.
- The Minister of agriculture strongly supported the promotion of organic farming in the country.
- First contacts with the main producers' organization were undertaken. Potential organic farms were identified and a first list was compiled. In the year 2001 a seminar on "Introduction to organic farming" was organized by the "Institut National des Recherches Agronomiques d'Algiers" (INRAA) with the contribution of the Research Institute of Organic Agriculture (ASI Global).

2. Regulatory aspects

There is no legislation on organic agriculture in Algeria. The competent authority for the promotion of organic farming is the Ministry of agriculture, principally through the following departments:

- the National Centre of Control and Certification;

- the Veterinary Services;
- the Vegetable Protection and Control techniques;
- Training, Research and Vulgarization;
- The National Institute of Agricultural Vulgarization.

3. Conclusion

Organic farming in Algeria is at its beginnings. However, there is a certain interest to its promotion from the authorities, especially the Minister of agriculture, and also from a certain number of producers. Some measures have been undertaken to set up a development project.

EGYPT

Ahmed El-Araby

Ain Shams University - Cairo

1. General aspects

The Egyptian agriculture has been fully organic for more than ten thousand years and until 1940. Since the beginning of agricultural activities in the Nile Delta and Valley and due to the high fertility of these soils, there was no need for any kind of fertilizers particularly in soils destined to be flushed and flooded every year by new fresh mud brought from the jungles of Ethiopia, Uganda and South of Sudan. Crop rotation, including clover and grasses for animal feeding, was used. Integrated animal and crop production system was practiced. In such a system animal urine and manure were saved for crop production. Natural agents for disease and insect control were used and are still being used in some areas nowadays. Most of these agricultural practices were documented on the temple's walls during the Pharaonic time, 5000-7000 years ago. These agricultural practices had been the main bases for agriculture and ecosystem sustainability for thousands of years.

Since 1940 the development of agricultural practices focusing on short-term productivity based on an intensive use of external inputs, such as chemical fertilizers and pesticides, introduced a fragile system of monocultures. This new system revealed to have many negative environmental impacts and harmful health hazards for both humans and animals. Serious threats on farmers, due to the use of chemicals, are increasing. Pollution of the Nile as a direct result of the intensive use of agro-chemicals causes a real health hazard for all Egyptian citizens.

Certified organic agriculture started in Egypt 23 years ago in the eastern desert where a small farm (Sekem) of about 17 ha produces medicinal herbs for export market. Expansion of this activity was quite slow until 1988. Thereafter, a rapid growth has occurred in the bio-dynamic production of vegetables, fruits, cereals, cotton and medicinal herbs. This rapid growth was initiated mainly by Sekem and by some other growers in Fayum and Kalubia governorates.

In 1995 a new group of organic growers established the Union of Growers and Exporters of Organic and Bio-dynamic Agriculture (UGEoba). The Union members produce and trade

mainly organic herbs, vegetables, fruits, potato and some cereals.

Shortly after, in summer 1998, a new organic project was started by Al-Hoda for agromanufacturing due to the high market demands for organic fruits and vegetables. At the same time Ever Green Egypt, Sonak, Sultan Farm, Fayum Society of Small Organic Farmers and others got involved in the organic movement (table 1).

The organic agriculture activity in Egypt is growing very fast due to the public awareness as well as to the increasing demands for organic food and fibers on both local and export markets. The number of farms reached more than 300, with a total acreage of more than 10 000 feddans (4167 hectares). According to the Egyptian Ministry of agriculture (2000) the total cultivated area is 7.4 million feddans (3 083 333 hectares) of which organic farmed areas represent about 0.14%. Beside the certified organic production, in the remote areas, there are more than 500 thousand feddans (208 333 ha) cultivated traditionally without any use of chemicals and depending only on the rain or the underground water for irrigation. From a technical viewpoint, these areas could be easily converted into certified organic production.

Organic and bio-dynamic productions in Egypt include all kinds of vegetables, mangetot, sugarsnap, baby corn, medicinal herbs, potato, citrus, grape, mango, banana, apricot, strawberry, liquorice, henna, palm date, cereals and cotton.

2. Regulatory aspects

In 1990 the Egyptian Bio-dynamic Association (EBDA) was founded to provide consultancy, training and applied research services to farmers. Together with the German and Swiss partners, EBDA established the Center of Organic Agriculture in Egypt (COAE), a local certification body.

COAE follows the inspection and certification schemes of the Institute of Market Ecology (IMO) of Switzerland. In 1997 COAE was registered as a limited liability company by Sekem, IMO and DEMETER international for inspection and certification. Sekem owns the major part of this company.

Later, in the same year, this company was accredited by DAP, the German accreditation organization. COAE office is located at the Sekem Headquarter at the beginning of Belbies Desert road, Hiekstep, Cairo. All inspectors, administrators and certification board members are local personnel. Inspection and certification are performed

according to the Demeter Bio-dynamic standards and to the EU rules and regulations. COAE inspects 122 farms distributed among 11 governorates as recorded in table 2.

In September 1995, the Egyptian Center of Organic Agriculture Society (ECOAS) was established as a nonprofit, non governmental organization. The 15 initiating members were university professors, agriculture experts, scientists, farmers and consumers. ECOAS started when some organic and bio-dynamic growers felt the need to establish another organic project in Egypt beside Sekem, which until 1995 was the only one in the country. Most of the initiators of ECOAS were working and co-operating with Sekem project.

ECOAS follows inspection and certification schemes reported in the Regulation (EEC 2092/91) and its amendments and in the IFOAM Basic standards. Naturland's guidelines are also taken into account. A complete inspection and certification scheme was designed for ECOAS to do the job under the supervision of IMO and Naturland.

Later on, within the framework of ECOAS and with the support of Naturland, four organic growers and Agrofood Company founded the Union of Growers and Exporters of Organic and Bio-dynamic Agriculture (UGEoba) and a local control body.

A filing system was designed for UGEoba for both farms and firms. Both IMO and Naturland were consulted at all steps, including the format of extension visits, inspection report forms, sanctions, and appeal procedures. Information flow through contacts with the international organic community was very helpful in improving performance.

An evaluation is performed annually by IMO and Naturland to meet international requirements and find markets for organic products in Europe.

From four organic farms and one firm at the beginning of the project in September 1995, we passed, in summer 1998, to 75 farms with an average size of 17 ha, and seven firms. Organic products include medicinal herbs and ornamentals, henna, fresh vegetables, roots and tubers, rice, wheat and cotton. These organic products are exported to most EU countries, the USA and Arab countries, besides being sold on the local market.

Later on, ECOA company was founded as a sharing company of ECOAS mainly for inspection and certification with the aim to comply particularly with the standards of IFOAM's International Organic Accreditation Service (IOAS), ISO

Guidelines 65 and the European Norms (EN 45011). A new organizational chart and job descriptions for all authorised personnel were developed. Policy paper and standards were prepared for a certification scheme to comply with international requirements.

In the year 2000, ECOA company was accredited according to the EU 45011 by the DAP, same German accreditation body which accredited the COAE earlier. All inspectors and certification board members are local personnel. The number of farms is 62 distributed among 11 governorates as recorded in table 3.

Due to the enormous evolution of organic movement in the country more projects were established in the last few years. The biggest is Al-Hoda for Agro-manufacturing which established the largest organic farm in the Middle East in Sinai with a surface of 650 feddans (about 150 hectares) producing organic vegetables, fruits, roots and tubers, peanuts and baby corn for both local and export market. Inspection and certification of this project is being performed by the English Soil Association ltd.

Three other small groups started in the last two or three years. These are the following:

- Ten farms and firms inspected and certified by the German BCS which has established an office in Cairo, which inspectors are both local and German. Certification is done according to the EU rules and regulations.
- Four farms and firms inspected by the Italian IMC which has established, one year ago, an office in Cairo and inspection and certification processes are performed jointly by local and Italian personnel. Certification is carried out according to the EU rules and regulations.
- Two or more farms are inspected by Bioagricoop, an Italian certification body, according to the EU rules and regulation. Both inspection and certification are performed by Italians. No office is known in Egypt for Bioagricoop yet.

3. Structural Aspects

Two large organic and bio-dynamic projects are now well established in Egypt: Sekem and UGEOBA. More than 3000 ha are organically grown in Egypt, and a very wide range of organic products are available on both local and export markets. Tables 1, 2, 3 and 4 show the organic activities of the different groups and organic projects until the year 1998.

The recent structural situation at the end of 2001 may be summarized in tables 5 and 6.

Farm numbers and productions in all projects are increasing quite fast. Organic activities in general are spreading rapidly around the country and all over the southern Mediterranean region. This happened particularly after the establishment of the Mediterranean IFOAM group (AgriBioMediterraneo) in July 1997, with its permanent secretariat at the Mediterranean Agronomic Institute of Bari, Italy.

3.1 Producers' Associations

- Egyptian Biodynamic Association (EBDA)

Address: Sekem, Hykestep, Belbeis Desert road, Egypt.

Number of members: about 137 growers plus Sekem Holding Companies

Products Types and Quantity (see table 5)

Products destination: local and export markets.

- Union of Growers & Exporters of Organic and Biodynamic Agriculture (UGEOBA)

Address: Agrofood Co. 3 Kampis str. from Mesadaq, Dokki Giza Egypt

Number of members: about 120 growers plus 7 Companies

Products Types and Quantity (see table 5)

Products destination: local and export markets.

- Egyptian Center of Organic Agriculture Society (ECOAS)

Address: 17a Hadaik Eloubor, suite 2 -12th floor, Salah Salim Str, 11371 Nasr City, Cairo Egypt.

Number of members: 30 scientists, growers and environmental activists.

Products destination: local and export markets.

3.2 Training activities

Sekem deals with Biodynamic practices training whereas ECOAS is involved in Organic agriculture training activities, such as:

- organization of a training workshop for junior inspectors from eight African countries through the IFOAM African Group project "four of organic agriculture till 99";

- organization of training seminars in Palestine and in Tunisia to help establishing organic projects in these countries;
- attempts to establish an organic project in Bosnia.

ECOAS' Chairman is coordinating the organic agriculture Committee of the Agriculture Commodity Council (ACC) at the Egyptian Ministry of Economy and Foreign Affairs as well as the ad-hoc committee for formulating the organic agriculture rules and regulation in Egypt.

4. Agronomic Aspects

Organic farming practices have long been documented in the Egyptian agricultural traditions. Safe use of environmental resources, building-up of soil fertility, biodiversity and the concept of natural equilibrium were used more than five thousand years ago. Animal manure and Nile mud were the only fertilizers used. Crop rotation was the only mean for soil fertility conservation, and solarization was used in plant protection and disease control. Social aspects were very important in the agricultural community, not only in Egypt but also in most Mediterranean countries. In recent times, in most southern Mediterranean countries, in both conventional and organic agriculture, a socially, culturally and economically integrated system is the main feature of the country side.

Today, in Egypt, the organic farming system depends on reasonable and continuous applications of composted animal manure and farm wastes and on the use of natural additives for enriching compost, such as rock phosphate, orthoclase, gypsum, desert shale, bone meal, as well as plant and seaweed extracts. Waste recycling is the predominant way of compensating the nutrients removed from the soil. Balanced crop rotations, with 20% legumes, are used with both deep- and shallow-rooted crops. Plant biodiversity is fostered, and the farm environment is made complex through the establishment of evergreen hedges and different plant species to accommodate birds and insects. Green manuring and cover crops are applied. Prevention and biological control measures are considered, beside the safe use of plant extracts and other natural substances for pest and disease control. A successful example is sulfur mixed with bentonite and lime to control mildew; jojoba oil and other mineral oils as insecticides; pheromone traps sticky sheets and mating disruption perfumes as well as cover crops for pest control. Sheep husbandry within the farm makes this system economically viable.

Integrated animal and plant farming is the most successful way to establish organic farms on newly reclaimed land in the Egyptian desert (a very arid climate). Minimizing the use of external inputs is a successful concept for enhancing the economic feasibility of the organic farming operation, in particular after the stop of governmental subsidies for most agricultural production.

The main issues opposing the progress of organic agriculture in Egypt are the following:

1- Some restrictions in the EU regulations concerning the long conversion period (three years) which is not necessary for Egypt because in most European countries, the growing season is short (four to five months per year), while in Egypt there are three growing seasons a year.

2- Manure limits per unit area requested by the EU regulations is quite low for the desert soils which is very poor in organic matter contents (less than 0.1%).

3- Organic seeds are not always available, sometimes even absent. If available, they are very expensive. There is no local organic seed production for many products particularly vegetables.

4- Disease and insect control is still not easy; biological control agents are imported and are very expensive. Local practices need to be developed through intensive research programmes.

5- Nitrogen requirements are still not fulfilled according to the allowed rates of application in all national and international rules and regulations. More research activities are needed for soil fertility conservation in the desert environment.

FRANCE

Gabriel Guet

Groupe de Recherche en Agriculture Biologique

1. General aspects

The French agriculture is dominated by cereals and the so-called "grandes cultures", including potato, sugar beet and wheat. Most of the growers receive subsidies according to the European Common Agricultural Policy, taking into consideration the competition with foreign countries.

Organic growers do have to respect the European Regulation (EC 2092/91) for plant production. They have to declare their intention of selling organic products, and they are to be controlled by certified organisms that check the technical management of different crops on the farm.

Organic Agriculture (OA) concerns around 1.5% of all cultivated surfaces in 2001 (i.e. 420 000 ha), which is increasing but not much compared to other EU countries like Austria or Holland. Most of the OA is done in south-east and west of France (Britannia) where mountains, vineyards and extensive crops are found.

Organic animal husbandry is strongly increasing, especially in the mountainous areas and in Britannia. The organic animal husbandry has led to the development of organic pastures whose surfaces have increased rapidly: pastures (70%), cereals and beets (18%), vineyard (3%), orchards (2%), vegetables (2%) and miscellaneous (7%).

However, organic animal husbandry has caused a lack of vegetal proteins in cereals, oleaginous and proteaginous, which led to the import of around 60% of the concentrates.

Subsidies for Organic Agriculture are given by the government during the conversion period (three years), and they range from US\$ 250 up to 600 for vineyards. Those subsidies may have convinced many growers to produce organically, without having the ethical behaviour, which is a must. We shall, thus, wait that subsidies drop down to see the evolution.

Different local groups are organising training, information and market initiatives for helping organic growers to sell and to be better known.

2. Regulatory aspects

The reference legislation is the European regulation (EC 2092/91) which is always readapted and discussed. Most of

the growers refer to this legislation but some do apply a more severe one, for example, Swiss (Biosuisse) or French (Nature & Progrès), as they consider that some elements of Regulation EC 2092/91 do not belong to their way of thinking Organic Agriculture.

Some growers also work "bio-dynamically" and have very few possibilities of using inputs, but enhance plant or animal health through telluric forces.

The competent authority is the Ministry of Agriculture (Direction Générale de l'Agriculture), which represents France in European decisions. Inspection boards are allowed to control farmers and to deprive them from their label.

Once the producer has gone through the 3-year conversion period, he is authorised to label his products with the logo :

This logo, put on the left of the label, is a national one, and is about to be replaced by a European one, to be put on the right.

During the first year of conversion the grower has to sell his produce traditionally. In the second year, he can indicate that the products are produced organically but in transition period.

Several independent organisms are approved by the government to make regular and unexpected controls on farms.

Those organisms are : Ecocert, Qualité France, Ascet International and Ulase.

Most of these structures have local delegates (table 1).

3. Structural aspects

According to 2001 statistics, there are 420 000 hectares (figure 1) organically grown in 10 400 farms representing 1.5% of the total cultivated area and 1.6% of all farms, respectively.

West and south-east of France are the more dynamic regions, because they are already very concerned with husbandry, and they have the capacity to develop pastures.

These regions are: Languedoc-Roussillon, Provence-Alpes-Côte-D'Azur, Franche-Comté, Alsace and Pays-de-la-Loire for the first ones.

Crop and animal productions are shown in tables 2 and 3.

There are some conservatories with old and local varieties of cultivated species, mainly fruits and vegetables. The main conservatories are reported in table 4.

3.1 Producers' associations:

- FNAB

40, rue de Malte

75011 PARIS

F.N.A.B@wanadoo.fr

- Nature & Progrès

68, boulevard Gambetta

30700 UZES

Nature.et.progres@wanadoo.fr

3.2 Research institutions

- Institut Technique de l'Agriculture Biologique (ITAB)

itab@itab.asso.fr

- Groupe de Recherche en Agriculture Biologique (GRAB)

grab@wanadoo.fr

- Civam Bio Corse

biocorse@aol.fr

- FRAB

civambiolr@wanadoo.fr

- GDAB

Gdab-mp@club-internet.fr

Main investigations are:

- assessment of varieties for organic farming;
- control of main diseases in respect of EC regulation: post harvest decay, fungi, aphids;
- fruit thinning;
- assessment of relations between the crop and its environment;
- relationship between soil and parasitism.

3.3 Training institutions

- Réseau FORMABIO

JM Morin

Morin@educagri.fr

- Ecole d'Agrobiologie de Beaujeu

Domaine de Malleval

69430 Beaujeu

4. Agronomic aspects

4.1 management of soil fertility

The mineralization and nitrogen kinetics of organic amendments are pretty bad known, since their precise composition is very mobile. Thus, growers hardly know if the organic matter they bring is helpful or dangerous for their soil and micro-fauna. This may lead to soil disfunction and, eventually, sterility.

4.2 Main issues in the control of pests and weeds

- use of natural insecticides (pyrethrum, rotenone and neem) and of antagonists (insects and molecules);
- mechanical control or managed seeding with non competitive species;
- alternatives to the use of copper: choice of varieties, low copper oxides, essential oils;
- EU regulation relevance with some accepted molecules.

We strongly have to enhance the global and systemic conception of organic farming: instead of thinking of a unique solution for a pest, we have to focus on strategies for avoiding this pest to occur in the crop. That means, prophylaxis, use of hedges and floral strips care are going to be more important for production.

The legalisation of more and more natural insecticides (which have a large and non selective spectrum) leads to a classical way of managing the crops and prevents the development of beneficial insects. Large use of copper may also be responsible for ground microbial unbalance.

4.3 Main authorized material for soil fertilisation, protection and processing

are those reported in annex 1 & 2 of EC regulation 2092/91.

4.4 Origin of the propagating material

Organic seeds are becoming more and more available, as seeders and growers are becoming interested. EC regulation asks for organic material starting from the beginning of the 2004, but a lot of research is needed before being able to supply all farmers.

Research institutes, like GRAB (Groupe de Recherche en Agriculture Biologique), are working for its feasibility: a fruit tree nursery was set up in 2001, to evaluate the feasibility of organic apple and peach trees. Some work has also been done for seed disinfection against fungi. ITAB (Institut Technique de l'Agriculture Biologique) joined the European network called ECO-PB, created in 2001 (www.eco-pb.org), which started research mainly on cereals.

There are different cooperatives and around thousand shops belonging to the Biocoop network (tables 5 and 6).

Supermarkets (mainly Carrefour and Auchan) are interested and offer more and more organic products.

The local market is always less important, compared to supermarkets.

The main foreign markets are: Germany (fruits and vegetables), United Kingdom (vegetables and fruits) and Northern Europe (table 7).

There are some marketing difficulties due to export constraints:

- Italian competition and lower prices for fruits and vegetables;
- Post-harvest decay of fresh fruits;
- high demand of northern Europe, which means long conservation period.

Many bio-markets and special bio-events are regularly organised in all the country.

Also the Ministry of agriculture organised, in 2000 for the first time, the "Printemps de la Bio", a national event for promoting organic produce with local organisms.

Ecocert also organises its national and annual event.

Annex 1 Source for the collection of data and information

1 ITAB network for organic trials in cereals is pretty efficient, and this kind of trials was done in 1999:

- variety mixtures;
- management of several wheat in organic farming;
- fertilisation monitoring;
- wheat yield comparisons;
- weed control.

2 see below the list of our past and present investigations, on perennial and vegetable crops:

- assessment of organic fertilisers mineralisation kinetics;
- comparison of qualitative and physico-chemical properties of organic and conventional carrots;
- control of pests in OA : fruit flies, codling moth, aphids, white fly;
- impact of hedges on the crop sanitary status;
- alternatives to copper on olive, potato and wine;
- alternatives to plastic mulching;
- observation of rootstocks and varieties behaviour.

GRAB has the role of national co-ordination for national fruit and vegetables trials, in order to avoid that experiments are being done twice.

GREECE

Renia Bitsaki

Mediterranean Agronomic Institute of Chania - Crete

1. Regulatory aspects and certification

The reference legislation in Greece are:

- Regulation EC 2092/91 with all its amendments;
- Regulation EC 2078/92 for the introduction of hectare subsidies;
- Regulation EC 1804/99 for organic animal husbandry.

The competent authorities for organic agriculture are the Ministry of Agriculture-Bureau of Biological Products and Agrocert-Organization for the Certification and Supervision of Agricultural Products.

All the Certification and Inspection Bodies are accredited by the Ministry of Agriculture.

All the inspection facilities as well as the personnel are Greeks. Some of the organizations have already gained a long experience and they have structured their services and facilities in a very efficient way. Generally, all the system of inspection and certification of organic products, as well as of accreditation of certification bodies, is harmonised with the European templates.

The following three Certification and Inspection Bodies exist in Greece:

DIO, SOGE and Fysiologiki.

DIO is the biggest one and certifies (1999) 2677 producers-businessmen.

No data for 1999 for the other two organisations.

Localisation: DIO: all over Greece, SOGE: all over Greece, Fysiologiki: Central & Northern Greece.

2. Structural aspects

2.1 Number of farms

The data come from the Ministry of Agriculture and from the three certification bodies, and they refer to 1998.

The number of farms in 1998 was 4231 and they represent 0.48% of the total farms in the country.

According to the Ministry of Agriculture in 1998, data were the following:

Area organically cultivated: 27 738 stremma (2774 ha).

Area in conversion: 126 282 stremma (12 628 ha).

The total organic and under conversion area is 154 020 stremma (15 402 ha) representing 0.47% of the total agricultural cultivated land.

Organic farms are distributed all over Greece as shown in table 1.

Table 1. Regional distribution of Organic Farms in 1998 (DIO and FYSILOGIKI, 1998)

2.2 Productions

According to the Ministry of Agriculture, 1998, organic productions was that reported in table 2.

2.3 Processing units

In 1998 there were 35 processing and packaging units while in 1999 there were 66, 27 of which dealing only with packaging, two with processing and 37 with processing and packaging. These data refer only to processing units certified by DIO (table 3).

2.4 Wild products

There are no data on collection of wild products. BIOLETA company in Lafkos, Pelion region cultivate organic herbs and collect little quantities of wild plants. Generally in Greece, especially in Crete, collection of wild herbs is common but there is no interest so far to certify them asorganic.

2.5 Producers' associations

- Cretan Agri-Environmental Group (CAEG)

P.O. Box 59, GR-70400 Moires, Crete

Tel: +30 892 22026

Fax: +30 892 22828

Number of members 115

Products: olive oil, olives, currant

Activities carried out: production, rural development, environment, research and training

- Agroenvironmental Network of Organic Producers of Western Greece (AE.N.O.P.)

Tel: +30 631 28381

Fax: +30 631 28381

Number of members: over 250

Products: olive oil, olive, currant, citrus, cereals and vegetables

Product destination: Greek and European market

Activities carried out: production, processing, trade and vocational training.

There are also some more small producers' associations as well as some mixed associations of producers and consumers.

2.6 Research

In Greece there is not so far a University Department or a Research Institute devoted exclusively to Organic Agriculture. However in all Agricultural Universities of Greece there are integrated topics and issues related with most aspects of Organic Agriculture.

Recently the Technological Educational Institute of Epirus has initiated a new department in Kefallonia island for "Biological Agriculture".

Besides, the National Agricultural Research Foundation is going to establish such departments as well.

There is also the National Network for Organic Agriculture, funded by the Ministry for Development, which includes in its activities the organisation of scientific seminars on Organic Agriculture.

The Inspection and Certification bodies of the country implement, also, training activities including courses, seminars and publishing informative books and magazines. Local Authorities very often contribute in these efforts as well as producers' associations (not only organic).

3. Agronomic aspects

The main problem is the conservative way of thinking of growers: they are used to apply the easy solution of chemical fertilizers, in combination with a low level of technical information.

The problem of soil erosion and soil salinity is significant in some regions of the country.

In most mountainous or semi-mountainous regions, the conditions do not permit to have access to mechanical means and, consequently, the application of green manure is difficult. Additionally the soil in such regions has often a low nutrient content.

Furthermore, since crop and animal production are traditionally separated in Greece, growers cannot be easily supplied with manure.

All over the Mediterranean countries and specially in Greece, many insect problems are very serious, for example the problem with *Dacus Oleae* Gmel. In many cases, plant protection products allowed in organic agriculture cannot control the pest efficiently. There is also a great number of weeds depending on landscape features, which are difficult to be controlled mechanically.

Since production in Greece is very limited, many organic products are imported. It is also the case of most fertilization and plant protection products allowed.

A lot of this imported material should comply with the European and the national legislation. The national legislation for plant protection agents is different than that for fertilization or processing and is rather strict.

The origin of propagating material in most cases is conventional, although in some cases it is organic (produced by the organic farmer himself). In most cases it is imported. At least the imported propagating material has to be sanitary certified.

The Mediterranean Agronomic Institute of Chania (MAICh) has been asked by most agricultural companies in Greece to tell which products allowed in Organic Agriculture to purchase (for fertilization, plant protection). There are a lot of local companies that either produce such products or import them.

4. Market aspects

Most of the organic products are sold in specialised shops. Fruits and vegetables are also sold in the local open markets. Organic wine is sold in some wine shops together with conventional one. A few big supermarket chains in the large cities have introduced organic products in their stock.

The main foreign markets are Germany and England and, at a lesser extent, USA. The most important product for export is olive oil, wine, fresh fruits, currants and vegetables. The local market absorbs mainly vegetables and some fruits.

Most organic producers or groups of producers trade their produce by themselves, without intermediate organisations.

5. Promotion of organic products

National labels and national laws, subsidies for farmers, trade and processors, training of farmers and consumers, setting up producers associations, development of state research, building of marketing channels are some of the goals that will support organic agriculture and will promote organic products.

ITALY

Vincenzo Fersino and Damiano Petruzzella

CIHEAM - Istituto Agronomico Mediterraneo di Bari

1. Regulatory environment

Organic farming had taken hold in Italy and across Europe, by the 1980s, in response to the growing demand for quality products.

During the 1990s, following the profound changes which were eked out in the Common Agricultural Policy (CAP) and the sharper focus on the environmental impact of agricultural activities, organic farming gained increasing acceptance.

Council Regulation (EEC) no. 2092 of June 24, 1991 on "organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs" was approved by the Council of the European Communities and published in the Official Journal (22/07/91).

Over the past few years, increasingly larger land areas have been converted to organic farming. Regulation (EEC) 2092/91, which set a regulatory framework and Regulation (EEC) 2078/92, which provided for the allocation of aid schemes to organic farms, have propelled organic farming in Italy as well.

A further stride ahead was the approval of the regulation on the development of a logo for organic products (Regulation (EEC) 331/2000) and of the regulatory framework on organic livestock farming (Regulation (EEC) 1804/99).

1.1 Inspection and Certification

Any operator who produces, prepares or imports from a third country organically produced agricultural products or foodstuffs shall notify this activity to the competent authority of the Member State in which the activity is carried out and submit his undertaking to the inspection system in force. The Member State shall set up an inspection system operated by one or more designated inspection authorities or approved private bodies.

The Member State shall designate an authority responsible for the supervision of such bodies to ensure compliance with the inspection rules.

Products can be marketed with indications referring to organic production methods, provided that they have been subject to the inspection and certification arrangements.

Annex III of Regulation (EEC) no. 2092/91 lays down detailed rules for implementing the inspection arrangements and sets the requirements operators shall comply with.

When the inspection arrangements are first implemented, the inspection body shall draw up a full description of the unit. In addition, the producer shall notify the body of its schedule of production of crop products, giving a breakdown by parcel.

Documentary accounts must be kept which allow to trace the origin, nature and quantities of all raw materials bought as well as the nature, quantities and consignees of all agricultural products sold.

Where an operator runs several production units in the same area, the land parcels and storage locations for conventional farming shall be clearly separated from those for organic farming. Crops of the same varieties as those produced at the organic unit may not be produced using conventional methods at the same units as the whole farm shall be subject to the inspection arrangements.

Processing and packaging units for organically produced products shall be subject to the same rules on identification, inspection and registration. The keeping of accounts shall enable the inspection body to trace the nature and origin of both raw and processed materials.

Where conventionally produced products are also processed, packaged or stored in the unit concerned, the unit must have separated areas within the premises for the storage of products and operations must be carried out continuously until the complete run has been dealt with, separated by place and time from similar operations performed on products not covered by organic methods. If such operations are not carried out frequently, they must be announced in advance to the inspection body. Every measure must be taken to ensure identification of lots and to avoid mixtures with products not obtained in accordance with the rules on organic production methods.

As far as importers are concerned, the inspection scheme measures are intended to ensure close check of the movements of each lot, through detailed information on the transportation and consignees of the products.

The inspection authority shall ensure that: (i) where an irregularity is found, the indications referring to the organic production method are removed from the entire lot or production run affected by the irregularity concerned and (ii) where a manifest infringement, or an infringement

with prolonged effects is found, prohibit the operator concerned from marketing products with indications referring to the organic production method for a period to be agreed with the competent authority of the Member State.

Each Member State is responsible for setting up a national inspection system, therefore, the systems which are currently operating vary widely among the Member States. In the Netherlands, there is one single inspection authority, whereas in Germany the inspection authorities (51) are Länder-based. In the other Member States the number of the inspection bodies is more limited: Belgium (4), Denmark (2), Greece (2), Spain (2), France (4), Ireland (4), Italy (9), Luxemburg (3), Portugal (2), and United Kingdom (7). Hence, with the exception of the Netherlands, the operator is more or less free to choose the inspection authority to which to be subject.

1.2 Inspection authorities in Italy

Like the vast majority of the Member States, Italy has opted for a mixed system whereby inspections are carried out by designated private bodies which, in turn, are supervised by the Ministry of Agriculture and Forestry and the Regional Boards (Annex 1).

Decree no. 220/95 sets a series of obligations which must be fulfilled by the inspection authorities:

- ensure that inspections carried out are objective and involving all the stakeholders;
- operate on an equal footing with no single sector outstripping the others;
- be permanently staffed with personnel entertaining neither professional nor economic relationships with the operators subject to the inspection;
- employ graduate or undergraduate skilful staff;
- be suitably equipped (head office, computer and technical equipment);
- have an organisation based in at least four Regions;
- carry out documented in-house audits and periodical revisions of compliance with the criteria listed in the UNI 45011 European Standard.

1.3 How to qualify for organic farming

Any operator wishing "to go organic" shall register with either an inspection body approved by the Ministry of Agriculture and Forestry or a designated supervised body.

Should the producer intend to convert only part of the holding, he shall indicate the "Production Unit" to be converted to organic farming, which shall be separated from any other units (by hedges, non productive rows etc.). In addition, crops of the same variety as those produced at the selected unit should not be produced at the other units (i.e. Golden apples).

Having decided whether to convert the whole farm or part of it, the producer shall draw up a report (the forms shall be provided by the certification bodies, the associations or the designated public authorities) containing a full description of the farm, as requested by the Ministry.

The producer shall send the report to the Inspection body and a copy to the Ministry of Agriculture and Forestry. Should changes occur in the farm, the producer shall notify a revised full description of the farm (explants, new planting, channels etc.).

Each year, the producer shall notify its Annual Production Schedule.

After the registration has been notified to the Ministry, the "Conversion period" starts, which lasts three years of consecutive harvesting for agricultural produce. After this period, during which compliance shall be ensured with the EEC Regulation, the farm production can be termed "ORGANIC". Hence, the production of farms in conversion cannot be sold as "organic", but as "transitional organic" and can only be marketed after the first year of organic farming.

Written and documentary accounts shall be taken of the implemented farming practices (treatments, tillage etc.) as well as of the raw materials bought and of the agricultural products sold with copies of the supporting documents (records/invoices). The necessary documents shall be provided by the Inspection Body.

Traceability of the production sold, in conversion or organic, shall be ensured (on a package basis, whenever possible) in order to unequivocally identify both the lot and the producer, through accompanying documents detailing the product quality and characteristics. (Documents and instructions shall be provided by the Inspection body).

1.4 Policies to support and promote organic farming

Regulation (EEC) no. 2078/92 on organic production and conservation of the countryside is an accompanying measure of the CAP reform (July 1992). It stipulates for aid

schemes part-financed by the EAGGF (European Agricultural Guidance and Guarantee Fund) Guidance Section to grant annual premia per hectare to farmers who commit to adopting agricultural production methods which have beneficial effects on the environment. In particular, the Regulation promotes the use of agricultural production methods which reduce the polluting effects of agriculture and favour farming systems that are compatible with the protection and enhancement of the environment, the countryside, the soil etc. Similar objectives underlie the production principles of organic farming. Article two provides for assistance to farmers who commit to significantly reducing the use of fertilisers and/or plant protection products or to maintaining the implemented reduction or introducing or maintaining organic farming methods, provided that these measures prove of environmental merit and have a positive fall-out on the environment and the countryside.

Measures designed to sustain integrated and organic production (reduced chemical inputs) are included and aids are granted, in the vast majority of the Member States, to both newly converted and pre-existing organic farms.

The "organic" measure stems from Regulation 2092/91 which provided fund assistance for training and demonstration projects.

No clearly defined aid scheme is envisioned to support the inspection system, but some countries (Austria, United Kingdom and some German regions) devote additional aids to such activities. Some other countries have also set up market-based and consumer-oriented technical updating and information services (Denmark, Austria and Germany).

Regulation (EEC) 2078/92 is an agri-environmental accompanying measure of the CAP reform, whereby the aid to agricultural income is not only de-coupled from the market action but is also aimed at implementing environmental protection policies.

Under this Regulation, A 1 and A 2 measures are specifically designed to curb the use of plant protection products, whereas A 3 and A 4 measures are focused on the introduction and maintenance of organic farming.

1.5 State of application

A 1 and A 2 measures (on supervised control and integrated production) take the lion's share (40% of the area covered by the Regulation and 56% of the submitted applications).

Organic farming (A 3 + A 4 measures) ranks second (15.9% of the total surface) outpacing any previous forecasts.

The reasons lie in the firm commitment of the public authorities that have helped propel low-impact production methods. A measures account for 79% of the total funds allocated (425 billions were granted in 1996) and the national area under this Regulation accounts for 7% of the Useful Agricultural Area.

The set objective was to attain 12% of the total farmland over the first four years.

A list of the other less specific aid schemes follows.

Regulation (EEC) no. 866/90 was designed to improve agricultural produce processing and marketing through fund assistance to investments in the agri-food business. Within the framework of the investments and expenditures eligible to EAGGF part-financing (article 11), provisions were introduced on organic farming. Absolute priority was given to investments which boosted new outlet-building. The Regulation (EEC) no. 3669/93, as last amended on December 22, 1993, further reiterated this concept referring to Regulation (EEC) no. 2092/91. Similarly, in the description of the annual selection criteria, the organic farming sector featured high among the general priorities. It is, therefore, self-evident that this Regulation was specifically designed to promote the development of a wide array of activities within the organic farming sector.

Within the framework of the reform of the Structural Funds (Regulation (EEC) no. 2081/93 of 20 July 1993, amending Regulation (EEC) no. 2052/88 on the purposes of Structural Funds), some Community regional programmes provide for the support of agricultural and rural development. These structural programmes are designed for the less prosperous regions (Objective 1) and the rural areas (Objective 5). Regulation (EEC) no. 2085/93, which sets out the provisions for the application of the actions funded by the EAGGF Guidance Section, is designed to support rural development in the aforementioned areas. The envisioned actions include initiatives to reconvert and diversify production and promote investments with a view to enhancing the quality standards of agricultural produce. This action opens up a host of fresh opportunities to organic farming.

The programmes, which have been approved by the Commission based on the proposals submitted by the relevant regions, grant fund assistance to a series of measures, actions and products. Therefore, whole sectors are backed by aid

schemes to part-financing of farms and processing and marketing plants and funds to facility strengthening, extension services, training and promotion activities.

Community action also focuses on agronomical research within the framework of Technological Research and Development programmes. The programmes, which are primarily designed for agriculture (AIR research programmes for the period 1990 -1993; the new programme for the period 1994-1998 is being finalised), include priority actions to develop new methods of activities with regard to agricultural quality and diversification. Organic farming fits naturally in those actions which periodically invite scientific institutions and universities to submit projects. The new Community programme for the period 2000-2006 is currently being designed. It includes measures aimed at enhancing and consolidating the development of Organic Farming.

2. Structural aspects

Italy is among the leading European Member States in terms of organically farmed areas and number of organic farms.

Based on data sets provided by the Ministry of Agriculture and Forestry, in 2000 in Italy there are 54 004 organic farms, 49 490 of which are only farms, 1330 are farms/processing units, 2817 are only processing units and 67 are only importers of organic products (table 1).

As far as the geographic distribution of farms is concerned, 67% of them are concentrated in Southern Italy and in the islands, thereby confirming a development of organic farming which is fine-tuned to some given cropping, soil and climatic properties.

The organically cultivated area is 1 040 377 ha, of which 502 078 ha are organically farmed and 538 299 ha are in conversion (table 2). Here again, Southern Italy has come to the fore with 71% of the area being concentrated in southern regions and in the islands.

In keeping with the Italian extensive-crop-oriented trends of production, the main organic farming sector is that of cereals and forage crops.

However, there is a scope for market growth for both the fruit sector (3%), the citrus sector (1.5%) and the olive (9%) sector, the main processed products being pasta, olive oil and preserves.

The main information gap in this connection concerns the market as the plethora of producers' associations (annex 2) yields no detailed domestic data.

3. Research and experimentation in organic farming

3.1 Agronomical features

The periodical censuses carried out by the "Centro di Documentazione Agricoltura Sostenibile" (CEDAS) and the Mediterranean Agronomic Institute of Bari (IAMB) on research and experimentation programmes indicate that an increasing number of scientific institutions are focusing on the organic production method.

A comparative analysis of the 1994 census (Agro-environmental Observatory in Cesena) and the 1998 census (CEDAS - IAMB) shows that the number of organisations and researchers soared from 50 to 100 and from 70 to 500, respectively. In addition, approximately 80 specific research activities on organic farming have involved not only mainstream research groups, but also universities and national and regional research centres.

The Italian scientific institutions are clearly lagging behind in the face of the fast-paced evolution which is sweeping across the international arena and activities are randomly scattered across the country as they are often funded with local resources. Only two programmes, which have been funded over the past few years by the Ministry of Agriculture and Forestry, can be regarded as truly nationwide.

The northern countries have long massively invested on organic farming research. Over the past decade, more than 400 projects have been masterminded in Norway, Sweden, Finland and Denmark, totalling Euro 40 million. Switzerland invests 3% of the funds allocated by the Federal Office for Agriculture on research in organic farming. Recent surveys estimated that the mean annual expenditure per hectare of organically farmed land amounts to Euro 25 in Denmark, Euro 40 in Switzerland and Euro 55 in Norway.

In the remaining countries, the investments on organic farming research are more modest, though the United Kingdom and France have recently increased their fund assistance share and have laid the groundwork for the development of targeted research activities in the years ahead.

Also the Austrian investments are deemed inadequate, given the growing importance the sector has gained (1.6% of the total expenditure in agricultural research).

In Italy, the funds which have so far been invested in organic farming research activities are absolutely ludicrous in the face of the relentless growth and the mounting technical difficulties presented by the Mediterranean climate and the fruit and legume sector. A projection, based on an estimate consistent with the European mean expenditure (Euro 20 per ha and per year) calculates for Italy an overall investment per year of Euro 19 million.

And this, despite the fact that, as yet, the organic sector has grown in response to rising foreign demand. Hence, given the expected increase in the domestic consumption of organic products, there would be much scope for expansion, up to an estimated 10%.

Generally speaking, on the one hand, innovation needs to be fuelled in the mainstream domestic organic sectors (fruit and legumes and cereals), whereas, on the other hand, it is advisable to implement strategies to boost the weaker sector (i.e. livestock farming) which is most subject to fierce competition from leading Member States.

Bottom line, despite some strong signals stemming from the Census, the information gap remains in the Mediterranean regions where strategies are modelled on the northern European systems, which differ widely with regard to cropping systems and soil and climatic conditions.

3.2 Main research topics and institutions

3.2.1 Soil fertility management

Organic farming and sustainable agriculture regard the soil as a renewable resource, the fertility of which has to be maintained and enhanced to the benefit of the generations to come.

The organic farming model epitomises the basic criteria which ensure the attainment of this key aim. These criteria, which are cited in the Council Regulation (EEC) no. 2092/9 of 24 June 1991 on organic production methods, highlight the use of green manuring and on-farm organic matter.

Four major research activities call for in-depth probing:

3.2.1.1 Soil conservation

Assessment of the impact of the introduction of organic farming systems on soil fertility and quality.

Identification of integrated technical pathways of fertilisation in organic farming.

3.2.1.2 Crop covers

Green manuring as a sound soil management technique in organic farming.

3.2.1.3 Recycling

Use of farming and agro-industrial residues for fertilisation purposes in organic farming.

3.2.1.4 Composting

Composting combines the need to properly manage "wastes", which have so far been regarded as an inconvenience and a cost item of productive processes, and the need to return organic matter to severely depleted soils, by reusing the direct or indirect by-products of production processes, thereby closing the natural biological cycles.

Compost can be described as an organic product of composting which can be used in agriculture to restore the equilibrium of the altered organic matter cycle.

Its use is conducive to sustainable agriculture in which a balance is struck between the organic matter which has been withdrawn from and that which has been returned to the biosphere.

Compost is often cited in Annex II of Regulation (EEC) 2092/91 (as last amended) which lists products authorised for use in soil conditioning. The importance to the sector is strategic since so far wasted on-farm organic substances (pruning and horticultural crop residues, straw and farmyard manure) and farm-related substances (oil-mill olive pomace and residual water, marc etc.) can be composted. In addition, a shift is brought about from farm to local enhancement involving all the stakeholders.

3.2.1.5 Technical grade products

- Characterisation and validation of the potential use of seaweed and plant extracts (for inclusion in the list of authorised products).
- Identification and gauging of methods of analysis for biostimulants.
- Identification of new formulations and application procedures to enhance the agronomic efficacy of natural products (bio-fertilisers and natural chelates).

3.2.2 Pest control

Organic farming is regarded by some people as a flat denial of synthetic chemicals and a return to ancient times which does not deserve further scientific investigations. By

contrast, the complexity of inter-playing phenomena calls for in-depth probing.

As to pest control, all the agronomical methods which ensure prevention of pest attacks have to be resorted to, such as crop rotations, the choice of resistant or tolerant varieties, hedges, the protection of useful organisms and, only if need be, the products listed in Annex II B of Regulation (EEC) no. 2092/91 are to be applied.

Plant protection products of low environmental impact constitute the only tools authorised for use in pest control under organic farming. Therefore, exhaustive data sets on technical grade products and thorough scientific investigations are required to back decisions on agricultural, agro-environmental, agri-food and agro-industrial policies to be taken on the regional, national and Community level. It is worth recalling that plant protection products authorised for use in organic farming are rather scanty and poorly effective and that, for some of them (i.e. copper salts), restrictions to the use are about to be imposed and this is a major stumbling block to the growth of organic production. Hence, an overall strategy needs to be devised in order to promote the reorientation of environmentally-friendly agricultural policies.

One of the objectives to be pursued is therefore to assess the efficacy of the currently applied pest control methods, develop the best dosages and identify the most suitable timing of treatments and the possible side effects of products.

More importantly, agro-system design actions have to be urged in order to boost the system "self-control", thereby limiting and/or nullifying the use of off-farm inputs. Of utmost importance to the Mediterranean region is then the identification of valuable alternatives to the use of copper.

3.2.3 Quality of organically-farmed products

The argument for the increased safety of organic products versus conventional ones, resulting from the prohibited use of synthetic chemicals, is often challenged by the claim that, in the absence of external protection from pest attacks, plants in general and horticultural crops in particular trigger self-protecting mechanisms and produce molecules in concentrations which are more hazardous to people's health than plant protection products. In addition, in the case of plants, the absence of external

protection systems magnifies the risk that biological contaminants will produce substances (i.e. aflatoxines) which are extremely hazardous to man.

More interestingly, little is known about the impact organic production methods have on nutritional and organoleptic properties as opposed to conventional methods. In this respect, it is fair to say that a comparison is often difficult to assess, because, beside the techniques in use, some other factors come into play, such as the variety, the maturity stage, the soil and climatic conditions, the sun radiation and the harvesting and post-harvest techniques. All the aforementioned factors are likely to induce changes in the chemical composition and nutritional and organoleptic quality.

Hence, there is a pressing need for additional and focused research programmes. Two approaches may prove helpful to assess and establish the quality of organic products:

- an agronomical approach designed to assess the extent to which specific agronomic practices which do without synthetic chemicals may impact on the chemical composition of organic products when compared to conventional practices;
- an approach keyed to the food-man relationship to assess the extent to which the total or partial consumption of organic products instead of mainstream products may affect the type and composition of the diet and the nutrient uptake.

3.2.4 Organic Stockfarming

Regulation (EEC) no. 1804/99 on organic livestock products has been adopted since August 24, 2000. However, most of the rules contained in it do not stem from technical and scientific investigations, which are lamentably rare in this field, but draw heavily from various European scenarios. Hence, the practicability of the proposed method remains highly questionable.

For an unbiased judgement to be expressed, insights need to be gained into some of the key issues which have taken and will take centre stage throughout the application stage.

The rules on livestock feeding feature high among the priority fields of investigation. The prohibited use of some feedstuffs and additives calls for the identification and experimentation of alternative products which meet the animal nutritional requirements. It is generally accepted

that feeding is one of the major determinants which is likely to affect the quality of livestock products, therefore, it is absolutely necessary to investigate the possible repercussions on milk and meat properties. However, the quality of organic products depends on a vast array of factors and focusing on the specific quality of organic livestock products is no easy task, as confirmed by the scanty bibliography available.

The physical and chemical properties of these products might be investigated for a start, based on the current production discriminating factors. The results would yield a few clues as to the best fitted system to produce meat which is more likely to be accepted by the consumers not only because of its compliance with the organic status, but also because of objective parameters and properties.

The development of analytical inspection and identification methods of organic stockfarming products may form the basis for further activities.

One of the issues which deserves marked attention is animal health, which plays a pivotal role in the regulation, ranging from prevention measures (the selection of appropriate breeds, livestock housing, rearing density, access to pasturage, animal welfare) to the use of homeopathic and phytotherapeutic medicinal products and the restricted use of chemically-synthesised allopathic medicinal products. This issue is all the more topical in so far as the consumer expects to buy organic livestock products which, like plant products, have not been treated with synthetic chemicals.

No less important is animal slurry from organic livestock farms, as some animals are kept on pasturage and this boils down to a whole host of problems. Given the slimness of data on the Mediterranean regions, guidelines on waste management should be knowingly advocated.

3.2.5 Assessment and design of the organic production method in farm holdings

The pattern of development which is still prevailing is modelled on intensive, specialised and highly productive farming which capitalises on cutting-edge technologies.

The impact of this production method on the environment and the conservation of natural resources have long been seriously underrated or shamefully neglected while food self-sufficiency and economic profitability were in the spotlight.

During the second half of the last century, the agricultural research activities and policies, which supported this model of development, have brought about radical changes in the agro-ecosystems. The food webs involved have been excessively simplified in order to attain the maximum yield per unit and off-farm inputs, especially plant protection products, fertilisers and energy, have been increasingly used with alarmingly devastating consequences on the environmental resources.

Over the past few years, the European scenario has substantially changed. Food self-sufficiency has been outpaced by surplus management and the demand for healthy and quality products has soared along with the awareness of the limited natural resources available. This has prompted the design of new production models, hinged on the sustainable development of rural areas, within which farming has been assigned a prominent role.

Against this new background, efforts are being leveraged to try out and transfer methods and models, which are best fitted for low-or-null environmental impact agriculture, envision a more rational use of natural resources and champion the use of low off-farm inputs and the enhancement of self-regulating mechanisms in the system.

Hence, methods based on measurable and comparable criteria need to be devised in order to thoroughly explore the farm dynamics and the various factors which interplay in the agro-ecosystem. Such an approach is indispensable to assess Mediterranean tailor-made organic production methods and gauge the innovations stemming from the experimental activities on the farm level.

Research should, therefore, focus on:

- the design of a method to analyse and assess organic farming systems and system/process innovations, based on measurable criteria;
- the multi-criteria assessment of the organic farming systems.

The technical capabilities are not lacking in Italy. A number of farms currently either produce most of the products admitted for use in organic farming or import them from foreign farms. Unfortunately, no data are available on the type and quality of the products in use, though a noticeable drop has been reported in the use of inputs in agriculture. From 1998 onward, the market for plant protection products has steadily shrunk as a result of a string of factors, such as the attempt at cutting

intermediate production costs, the use of low-dose products, the market trends and the climatic conditions. Fungicides and insecticides have recorded the sharpest drop. The total consumption which equalled 160 thousand tons in 1996 dropped to 110 thousand tons in 1998.

As to the plant propagating material, which is available in Italy, though not enough to meet the demand, the share traded remains low and hard to quantify, given the derogation period ratified by the European regulation.

3.2.6 Some of the most active Research Institutes

- Istituto Sperimentale per la Zootecnia - Rome
- Istituto Sperimentale per la Nutrizione delle Piante - Rome
- Istituto di Patologia Vegetale - Rome
- Istituto di Ricerca per gli Alimenti e la Nutrizione - Rome
- Istituto Agronomico Mediterraneo - Valenzano (Bari)
- Centro di Sperimentazione Agraria e Forestale - Laimburg
- GRAB-IT Gruppo di Ricerca in Agricoltura Biologica - at Ancona University
- Dipartimento di Agronomia - Florence University

4. Training and awareness-building in Organic Farming

One of the major stumbling blocks to the development of Organic Farming in Italy is the poor training, information and know-how transfer activity. The latter relies heavily on conventional strategies (publications and conferences). Farm assistance services, demonstration, training and reskilling programmes are lamentably lacking. In addition, the vast majority of promotional devices, though multimedia-based, are not sufficiently updated to catch up on the evolution of technical and scientific findings.

Networking is a priority for organic farming researchers and scientists with a view to:

- forging links between the demand for research and decision-makers;
- circulating information and expertise, thereby initiating synergies and reducing redundant overlapping;
- fostering constant updating with respect to regulations, technicalities and methods;
- improving the spreading of the results of the activities.

In order to ease the transfer of scientific knowledge and information, within the framework of the inter-regional programme on organic farming, the Ministry of Agriculture and Forestry has funded a project to set up a national information system on organic farming (BIOITALIA). The project, which has been implemented by IAMB, was designed to:

- set up a national and a series of regional Web sites on organic farming;
- promote information exchanges between the Ministry of Agriculture and Forestry, the Regional Boards and the Inspection bodies (institutional Intranet);
- foster the spreading of scientific knowledge and exchanges between the stakeholders involved;
- set up a national documentation centre;
- back up the Regional Boards in handling the data sets relating to the application of Regulation (EEC) 2092/91.

Within the framework of this inter-regional programme, ISMEA (Istituto per gli Studi, Ricerche e Informazione sul Mercato Agricolo) was funded a promotion and communication project on organic farming and the Agency for Agricultural Development of Tuscany was sponsored a training course on the surveillance of inspection bodies. A host of local activities have been launched within the region. Noteworthy is BIOPUGLIA information system (www.biopuglia.iamb.it). However, despite the strides made, organic farming has still a long way to go.

5. Market issues of organic farming

5.1 Type of local market organisation

The marketing of products obtained from organic farming has always presented specific problems. In the past organic farmers used only direct selling channels; afterwards the first specialised shops were opened and a rapid increase in sales has then been experienced through specialised retailing (specialised and herbalist's shops). Direct selling, herbalist's shops and specialised shops are still the main channels of sale by retail.

These types of sale show nowadays structural limits and hence restrain the growth potentials of the sector.

Starting from the late nineties, to satisfy the constraints imposed by the market evolution, a renewal process in sale types has started. Such a renewal process implies the enlargement of premises, the training and re-organisation

of the staff, the introduction of informatics as a support to management, and the adoption - also in the field of organic products - of the marketing tools currently used for all agri-food products. In particular, the enlargement of the average selling area is essential for reducing the incidence of fixed costs on the turnover of the business. The experience shows that the limitation of commercial costs is the first step to get the reduction of selling prices, that is historically one of the critical points of district shop supply.

In 2000, in Italy there were 1038 points of sale by retail (table 3), including specialised shops of organic products, herbalist's shops, natural food shops, macrobiotic and dietetic shops¹.

The alternative to traditional retailing is the Modern Distribution, where till few years ago, the organic product had not its own space and in some cases it was devalued by a random arrangement.

At present organic productions are the core of a reasoned policy of single signboard differentiation. In 1998, in Italy there were 357 supermarkets with a selection of organic products, mostly fruits and vegetables. At the end of 2000 their number exceeded 1400 units (table 4).

5.2 Type of product and quantity

An important parameter in assessing the economic weight of organic farming is the production pattern; it deeply affects the economic and commercial evaluations of the producing farms and their level of pro-fit.

Based on the data provided by the Italian inspection bodies, at the end of 1999 (figure 1), 38% of the Agricultural Area, both organic and under conversion, was grown with forage crops. The 15% of the production patterns is devoted to forage-pasture crops. The largest area of forage and forage-pasture areas is found in Sardinia. These data explain the strong characterisation of organic farming for extensive crops.

Cereal crops account for 19% of the national area, and rank second, with a cropped area - in 2000 - of over 194 600 hectares, of which more than 40 thousand hectares in Sicily, 31 thousand in Sardinia and 29 thousand in Apulia. These three regions account for half of the national organic cereal production. The third crop is olive that accounts for 9% of the Agricultural Area, followed by the other cropping patterns.

5.3 Main market outlets and types of product

The success that organic farming is starting to experience is the result of a deep transformation of the food awareness of the Italians who - during the nineties - turned to the organic products as a reaction to the fear triggered by the Chernobyl accident, by the atrazine contained in water and by the frequent alerts of newspapers on the progress of chemistry in foodstuffs.

At the dawn of the new millennium we are definitely out of the pioneer stage of organic products, characterised by some aspects of pauperism and healthiness, and we are going to enter the age of marketing and of the communication of the product value to the consumer: an austere image is not interpreted any longer as a guarantee of healthiness and safety of cultural techniques.

The changes in the approach to food fruition have induced some modifications also in the structure of preferences and in the willingness to purchase, increasing the number of people who consider the consumption of organic products as the best way to effect a healthy diet.

In Italy, the modes of supply and the low level of investments in the communication have not favoured the approaching of new potential consumers, so that organic product purchases are mostly concentrated in Northern Italy, whereas the level of consumption is still low in the rest of the country.

A market research, carried out at the end of 1998 within the Biopuglia project on the consumption of organic products in Apulia, has enabled to outline the model of Apulian consumers purchase behaviour, providing useful indications to those who should take strategic market decisions or to those who want to have additional information about the Apulians' customs towards this category of products.

Beyond some products mostly consumed by adults (wine, dried fruits) or by youth (honey, fruit preserve) all types of organic products are consumed by the whole Apulian family.

The preference for fresh, or at least poorly elaborate, products, typical of the Mediterranean diet, is observed in the commodities mostly purchased by the Apulian consumers: cereals and their derivatives, fresh fruits and vegetables, honey, milk and dairy products, fruit preserves, olive oil, tomato sauce and wine.

The Apulian consumers of organic products purchase frequently but in small quantities.

The place of purchase mostly used by Apulian consumers is certainly the specialised shop, where one can buy, in very high percentages, all types of products, especially the dried and processed ones.

Fresh fruits and vegetables are available in specialised shops or directly at the producer and only marginally in supermarkets. Besides fruits and vegetables, oil and wine are mostly purchased directly at producers' farms.

Lastly, it is noteworthy that a substantial portion of the national organic production is not marketed on the domestic market, but it finds an outlet in foreign markets. Unluckily, no statistical monitoring system is now available to quantify the fluxes of product that are consumed outside the national boundaries, and the destinations.

5.4 Data on the domestic consumption

Estimating the consumption of organic products in Italy is not very easy due to the high fragmentation of production structures, the strong presence of direct and informal channels and the uneasy definition of market boundaries.

In Italy, the same as in most European countries, organic products are confronted with a competitive universe that includes also other products; it may be defined universe of the natural. It comprises natural products², dietetic products³ and the products obtained from integrated cultivation.

Considering only the organic products marketed as such, and easily identifiable by the consumer, the estimated market size is between US\$ 1000 and 1050 million. The volume of business of the organic sector has grown, over the last few years, at a mean rate of 9% and presently accounts for 0.9% of the total food consumption of the Italians. Some estimates indicate, for the first years of the twenty-first century, a 2.5-3% incidence of the organic sector on the total food market. A considerable share ranging between 30 and 40% comes from foreign countries.

5.5 Forms of organic product promotion

The promotion of organic products is usually undertaken so as to develop the knowledge and the consumption of a product or to contribute to the strengthening of products already consumed.

Promotion is often associated with "enhancement", including several actions aimed at increasing the value of products and at subsequently increasing the market price.

The forms of promotion and enhancement are a major tool to stimulate the demand for organic products. Among the forms of promotion and enhancement including the participation in fairs and national and international events of the sector, the adoption and promotion of trade-mark policies, the promotion of the organic sector is also effected today through the association of the organic message and of its products to other aspects of public interest that are particularly successful towards consumers, citizens and their institutions. The organic sector is actually promoted also through actions and projects in the fields of environmental and food education, holidays on the farm, rural tourism and social solidarity, all action areas with which the organic sector seems to create easy and natural synergies.

Following the provisions in force, all the Italian organic products are marked by at least two trade-marks: the EU trade-mark, represented by the wording ORGANIC FARMING - EEC INSPECTION REGIME, supported by the private trade-mark of one of the nine certifying and inspection bodies recognised in our country.

On the same product, the single producer can also apply his own business trade-mark, to distinguish it from other similar products and exploit the renown and trust of the consumer, acquired through advertising campaigns and successful promotional actions.

Although still emerging for the moment, the introduction of organic products in collective catering services could be, in the long run, an important commercial outlet for the sector. It is, at the same time, an equally powerful promotional incentive.

Moreover, rural tourism has attracted an increasing number of visitors over the last few years. The reasons for the great success are basically the supply of new low environmental impact recreational services, that are alternative to the traditional tourist packages, and the possibility, supplied by rural tourism, to get near to nature, to its cycles and its equilibrium.

The need for re-establishing a contact with the natural environment, on one hand, and the concern for its preservation, on the other, are indeed topical themes that

are increasingly common to the different social and economic groups of modern societies.

Organic farming, for its part, responds, in an efficient and stimulating way, to this wish of nature. It favours the preservation and enhancement of rural resources, agricultural systems, local landscapes and communities, and, at the same time, through the supply of healthy and genuine products, it acts on the diet that is a crucial aspect of the every-day life.

Lastly, it seems important to mention, in this context, the so-called "organic small-scale markets", organised by local bodies and associations, to upgrade a village, a district or a natural area, supplying tourists and residents with a pleasant attractive. These are, mostly, occasional events in which organic producers exhibit and sell their own goods together with bee-keepers, craftsmen and artists, retailers of herb-products, booksellers, organic, environmentalists', volunteers' associations and other agents of the ecological world and of "natural living". Within these fair-markets other activities and events are also organised to enhance the informational and promotional aspect of the event, beyond the merely commercial one.

LEBANON

Jean Estephan

Ministry of Agriculture - Beirut

1. General aspects

By the end of the war, the Lebanese citizens started to put more attention on the quality of their food and to claim products clean from pesticide residues and other chemicals. Organic farming started upon the demand of the local market. Of course, it started spontaneously without any regulation, norm or special technique or product. Thus, what is known on the market as 'baladi' or local/traditional product is considered more or less an organic product. These products are mostly ancestral produced without the use of chemical inputs. Other products followed to fulfill the market demand. Unfortunately, the number of farmers is still reduced and the development of organic farming is compromised. The main reasons are the following:

- the economical crisis since the end of the war, and especially the last 3 years, which reduced the demand of the market and the abandon of organic production by many farmers;
- the lack of investments in the agricultural sector in general: both the government and the private sectors don't give priority to agriculture since the beginning of the war;
- the lack of information and know-how on organic farming at the farmer's level and the absence of regulations and extension service at the ministry level;
- the absence of any regulation concerning organic farming, and the absence of foreign inspection and certification bodies.

Nevertheless, many potential points should be mentioned:

- the climatic conditions of the country are optimal for many agricultural crops such as: sub-tropical and tropical fruits (avocado, anona, banana, citrus and loquat), Mediterranean crops (cereals, legumes, fig, olive, grapevine, almond and pomegrenade), temperate fruits (apple, pear, cherry, peach, plum and walnut) and vegetables (potato, tomato, cucumber, watermelon, melon, strawberry, lettuce, cabbage, beet, onion and garlic);
- the agro-industrial sector is well developed and is able to absorb a part of the production;

- the will of many farmers to convert into organics if the marketing of their products is assured;
- the accessibility to information for engineers and the possibility of importing necessary techniques for organic production;
- the awareness of a big part of citizens to the necessity of having clean and healthy products.

The aspect of organic farming is very heterogeneous and changes from a situation to another, but we can define three types of farmers in Lebanon:

1) Amateurs that do genuine organic farming due to their personal conviction and awareness: They are not real farmers. Most of them have access to foreign information and techniques through their original career. These farmers lack organization, and need a technical support to resolve their field problems. They have a small-scale market and do not count on their production to make money.

2) Farmers that do organic farming on an economical scale, due to their awareness and conviction: These farmers count on their production to live. They also lack information and need better marketing channels and evaluation for their products.

3) Farmers that - ipso facto -do organic farming on an economical scale: these farmers usually do not use any chemical input because either it is not feasible or they cannot afford buying those inputs. This is the case of non-irrigated crops (cereals, legumes, "mekti", garlic, watermelon, grapevine, cherry, apricot, almond, mulberry, olive and apple) and forest products (pine nut, carob, sage, oregano, sumac and blackberry). These farmers are numerous and can reach more than 30% of the number of exploitations in some areas. They do not have any scientific knowledge about organic farming.

In Lebanon farmers do lack of all kinds of support: no legislation, no norms, no certification, no extension service, no material or technical support, no marketing or advertising support, neither from the state, the private sector nor from foreign companies.

A few foreign experts ensure some knowledge transfer to some local agricultural engineers and farmers, within the umbrella of Non Governmental Organizations (NGOs) such as Greenline and MECTAT (Middle East Centre of Transfer of Appropriate Technology).

2. Regulatory aspects

The legislative aspect of organic farming is still not defined in Lebanon. Actually, there are no legislations or norms for organic farming. There are no organisms that are inspecting and certifying the production either.

The small-scale market counts on the honesty of the farmers, while some supermarkets claim certification and prefer to import their products. As there are no organic farmers association or cooperative, the legislative process is very slow.

LIBNOR is the official organism responsible for the elaboration of norms and standards.

Greenline is an NGO that seeks to make a cooperative so as to make a certification by a foreign organism feasible on the farmers' scale.

MECTAT, the Ministry of Environment and the United Nations Development Programme (UNDP) are trying to launch a national project to define the norms and legislations of some organic products (Citrus, Olives, and Vegetables) and insure the inspection and certification program.

Choutoul Est. is planning to open a laboratory to test pesticide residues in the products that they buy from the farmers.

3. Structural aspects

3.1 Farmers and type of production

As mentioned before, there is no statistical information about organic farming in Lebanon. This induced me to make a survey on the field to gather some information about the situation of this sector.

The number of farmers cannot be defined because there is no certified farming or products, but there are some farmers who can be considered as potential organic farmers if certification is ensured. Many farmers are willing to convert into organic farming too, if certification and market are available.

The overall surface of organic farming cannot be defined, though the total cultivated area by the mentioned farmers does not exceed 160 ha and 90 ha in conversion, out of 247 934 ha (total cultivated area of Lebanon in 1999). The farmers grow several crops at the same time and do not have a notebook, which make the estimation of the surface area dedicated for each crop hard to define. In Annex 1 are reported the main organic producers.

Choutoul Est. is a company which has been buying products of different farmers producing a wide range of crops and distributed in all the country (table 1).

Many others are ipso facto growing without using any synthesized chemical products, and selling part of their production as organic, like the cooperatives of Taraya and Aarsal.

In Taraya, wheat, lentil, chickpea, grapevine and mekti are grown "organically" on 1200 ha approximately. Almond, fig and bean are produced but only for house consumption. In Aarsal, some of the cherry production is sold as organic.

Crops grown traditionally without the use of chemical inputs could give potential organic products. These crops include the typical Mediterranean non-irrigated or partially irrigated crops (table 2).

Other crops are grown but, due to the intensive agricultural practices, they require (irrigation, fertilization, weed control and pest management), their conversion into organic farming is difficult on a short-term perspective.

3.2 Product price

The information on farm price is not available for all crops, especially when most of the products are either sold at the same price as conventional products, or consumed by the farmers (table 3).

3.3 Wild products

The main collected wild products are:

Pine nuts (*Pinus pinea*) and Carob pods (*Ceratonia siliqua*): pine nuts are collected from the pine forests found in the central part of the country, on the coastal slopes of Mount Lebanon from sea level up to 1500 m. The estimated exploited area is only 6100 ha, giving a production of 16 500 tons of nuts. Carob trees are found on the coastal slopes up to 800 m either spontaneously in the Mediterranean oak forest, or grafted and planted near olive orchards. The estimated exploited area covers 700 ha and the production of pods is around 7400 tons. Pine nuts and carob molasses are used for culinary purpose in the local market. A part of the carob molasses is exported.

Many other plants (or parts of the plant) are collected for culinary or medical use. Most of these species are found:

- in all mountains under 1500 m: *Campanula rapunculus*, *Cichorium intybus*, *Eringium creticum*, *Malva sylvestris*,

Matricaria chamomilla, *Melissa officinalis*, *Micromeria myrtifolia*, *Origanum syriacum*, *Pyrus syriaca*, *Rosa canina*, *Tanacetum parthenium*, *Malva sylvestris*;

- from sea level up to 2000 m on coastal slopes only: *Alcea setosa*, *Crataegus monogyna*, *Malus triloba*, *Prunus mahaleb*, *Rhus coriaria*, *Taraxacum officinalis*;

- in humid areas: *Eleagnus angustifolia*, *Mentha aquatica*, *Mentha pulegium*, *Nasturtium officinalis*, *Rubus tomentosus*, *Rubus collinus*, *Rubus hedycarpus*, *Tussilago farfara*, *Urtica dioica*, *Urtica urens*;

- in alpine areas (over 1500 m): *Ferula hermonensis*, *Gundelia tournefolii*, *Rheum ribes*;

- under the Mediterranean forest only (from sea level up to 1000 m): *Laurus nobilis*, *Myrtus communis*, *Salvia fruticosa*.

Many other species have culinary, aromatic or medical properties, but they are not explored at all by man (i.e. *Salix alba*, *Juniperus oxycedrus*, *Capparis spinosa*, *Lavandula stoechas*).

3.4 Processed products

Agro-industry is a prosperous sector in Lebanon, but unfortunately, most of the raw material is imported. The main agro-industries that are using local ingredients and that can give a potential organic product in the future are:

- Olive: organic oil production is done in the same unit that extracts conventional olive oil. There are 485 units and scattered all over the country (50% in the North), especially in the main producing areas: Koura, Zgharta, Batrun, Aakar, Hasbaya, Marjayoun, Bent-Jbeil, Tyr, Chouf

- Wheat: grinding wheat produces Borghul, and drying a mixture of the precedent with yogurt produces Kishk. Both products are homemade or produced by small-scale industries. These industries are mainly found in Bekaa valley area. Only a few farmers produce organic Borghul and Kishk (mainly E. Ayub).

- Carob molasses extracted from carob pods in small extraction units are found mainly in Batrun, Jbeil, Metn, Chouf and Tyr areas. Only three factories are registered at the Ministry of Industry and they export some of their production of molasses and carob seeds.

- Grapevine: although vinegar, molasses, arak and wine are produced on small scale, there are 84 factories that produce most of the alcoholic drinks (wine and arak) mainly

in the Bekaa valley (Zahle, West Bekaa and Rachaya) and Mount Lebanon (Keserwan and Metn), but no organic products are mentioned. It is to mention that Lebanese wine is famous Worldwide and 40% of the production is exported (more than three million bottles). Most of the vineyards producing wine and arak, are grown without using synthesized chemicals or fertilizers.

- Many fruit jams, and syrups are produced, but very few can be considered organic (sugar free blackberry jam). Others are produced by using conventional sugar (mulberry syrup, apple juice, apple, quince jam and apricot jam). Antoine Chamoun (Jwar-el-Hawz/Baabda) is a potential organic producer of these items.

- Goat milk gives organic dairy products (E. Ayub in Kfarmeshki/Bekaa). Many shepherds are also producing labneh, cheese and cream from traditional farming, counting only on natural grazing land, and not using any chemicals for veterinary uses.

Most of these units are present at a regional scale, and thus are not registered at the Ministry of Industry. Many products are also homemade which makes impossible the estimation of the quantity of production and the number of processing units.

There is no processing unit dealing only with organic products and having any kind of certification.

According to Choutoul est. ther is a project Factory in the Metn area to process organic products. This factory already processing conventional products. The main items will be: carob molasses, tahina (sesame oil and sauce), fruit jams, pomegranate syrup, grape molasses, Borghul, kishk, apple and grape vinegar.

3.5 Associations

Associations dealing with organic farming (production or marketing) do not exist, but some agricultural cooperatives are trying to market their products as organic (Cooperatives of Taraya and Aarsal).

The first organic farming cooperative will be founded soon, with 8 members by the help of Greenline and the Ministry of Cooperatives. The main activities of this cooperative will be ensuring the inspection and certification services and the selling of their products (vegetables, olive oil, wheat and lentils).

3.6 Research

LARI (Lebanese Agriculture Research Institute) is the official research organism. It has several branches dealing with food quality, animal husbandry, plant protection, soil science, irrigation, plant breeding and plant production (cereals, olive, grapevine, citrus, almonds and greenhouse crops).

The National Center for Scientific Research (CNRS), American University of Beirut (AUB), Lebanese University (LU), St Joseph University (USJ) are also involved in scientific research.

AUB, LARI, LU and the ministry of agriculture are working on the biological control of Citrus pests (Leaf minor, Aphids, Mediterranean Fly and Tristeza Virus) in collaboration with the Citrus Board in Tartus-Syria.

LARI has also many programs and research lines that could be converted into organic farming such as:

The introduction of *Encarsia formosa* for white fly control; Population study on *Cales noaki* and other predators and parasitoids of Citrus pests; Biological control of the Mediterranean fruit fly etc.

4. Agronomic aspects

4.1 Management of soil fertility

This is the major problem for organic farmers due to the lack of organic components for composting. Forage crops are not always available in Lebanon.

Crop rotation and soil fertility are not taken into consideration when planting a crop, due to the small scale land and economical reasons.

Animal production is not enough to produce manure for all farmers, and mixed farms (crop and animal production) are not common in Lebanon. The manure is either applied fresh or dry but rarely as compost.

Green manure is not common and the only species used are mainly cereals (wheat and barley) and legumes (vetch, lucerne and fava bean).

Some of the amateurs produce their own compost, but due to their limited resources, they cannot increase the cultivated surface. Besides, small farmers, or orchard cannot make their own compost or make a crop rotation.

Some farmers import organic compost (with 18 units of nitrogen added).

Two existing factories produce compost, using mainly the remaining of olive oil, carob molasses and sugar beet extracts (NPK content: 2-1-2).

4.2 Control of pests and weeds

Pest management is the main problem for many organic growers: the main pests are leaf miners, mites, aphids, Mediterranean fruit fly, olive fly, mildew, blights, rust and botrytis.

Under greenhouses, pest management is either very expensive or not feasible (Dakkache, 1998).

Farmers use only copper and sulfur as chemicals to prevent fungi and mites attacks. They also try to use cultural practices such as protecting the leaves of some vegetables from leaf miners by a fiber film or cover. Others use some traps (for flies), or try to release natural predators and parasitoids (in citrus orchards against aphids, citrus leaf minor and mealy bugs).

Bacillus Thurengiensis is also used against Lepidoptera worms.

Most of the organic amateurs do not have any knowledge or agricultural background to resolve pest management problems.

Weed control is done mechanically (by hand or ploughing).

4.3 Availability of technical means

Most of the material and techniques are imported from European and North American companies (France, Italy, UK, Germany and USA). Some organic technical means are imported only on personal command. Thus, organic pesticides, traps, fertilizers and compost are not very common, but could be always be imported by local companies.

The most commonly used organic pesticides are: cooper, sulfur and Bacillus Thurengiensis.

4.4 Authorized material

As there is actually no norms and certification, there is no mention of authorized or non-authorized material in Lebanon.

4.5 Origin of the propagating material

Most of the amateurs import their seeds (mostly conventional), especially for vegetables as they grow them on a small scale.

Local cultivars of vegetables, cereals and legumes come from local conventional seeds. This is the case of tomato, white cucumber (Mekti) and white zucchini which are produced by the farmers themselves or by specialized farmers or companies.

Fruit trees are propagated in local conventional nurseries, using non-certified material. Recently some companies importing new varieties of fruit trees, certified as "virus free" from France and Italy (vines, pome and stone fruits).

4.6 Local companies producing technical means

National companies producing compost at a large scale is DOUBALINE in Aanjar in the Bekaa valley, and MDAWAR establishment in Dekwaneh, Beirut.

Companies producing seeds and propagating agricultural material are almost absent. Only HAYEK establishment in Bsouss (near Beirut) has a tissue culture laboratory to produce strawberry, banana and ornamental plants.

AGROTEC has a factory of agricultural sprayers. It is located in Bechmezzine in Koura. Many companies produce agricultural tools and they are mainly located in the Bekaa valley (the final list of these factories will be made upon request at the Ministry of Industry by the end of December).

5. Market aspects

Marketing of organic products is not developed like in Western and Northern Europe.

The term "organic" is mixed up with "natural" and with "dietetic", we can find organic products hidden and mixed with other products used for special diets or with natural products known as "baladi".

These products started to have a place among the supermarkets and the dietetic shops of Beirut and its suburbs (Abou Khalil, Basha, Bechara, Coin du Régime, Goût Frais, Smith, Spinneys, Tony Maroun) but this experience failed in most of the supermarkets and contracts didn't last for more than 6 months.

Marketing of the products by the farmers themselves is also common.

Some farmers have started to send their products to restaurants. While Crepaway, a fast food chain (6 branches in Beirut and suburbs) is studying a project for shifting into organic food.

Trying to find a solution for marketing the products, Choutoul Est. which is the main provider for the supermarkets has started with some associates to open specialized shops in Beirut and suburbs (first shop in Jisr el Bacha will open in January 2001). On a long-term project, a gross market will be established in Beirut.

As mentioned before, there are no available data about local consumption, or importation of such products (because all products are mixed together). But it is known that all the organic farmers sell their production for the local market only.

There is no export of organic products because there is no certification from one side, nor big farmers or producers' associations from the other side.

Potential organic products are many, including carob molasses, pine nuts, sage leaves and other wild products that are already exported.

Finally, due to the modesty of the production, there is no specific promotion for any product or farmer. Anyway, until now the demand is much higher than the production.

This does not mean that the farmers do not suffer from marketing problems. The major constraints are:

- the modesty of the production diversity and quantity of a single farmer in a matter that he cannot fulfill the needs of a supermarket for a season or all year round;
- the absence of cooperatives, merchants or boards that can deal with the farmers to buy their products and resell them to the supermarkets and specialized shops and to make promotion for these products;
- the absence of any certification and labelling to install a certain trust between the farmers and the market.

MALTA

Peter Agius

Ministry of Agriculture

Introduction

The Maltese archipelago consists of three main islands: Malta, Gozo and Comino, the total area being merely 315 km². Malta, the main island, measures 246.6 km², Gozo 65.8 km² and Comino 2.8 km². Out of these 31500 ha just over 10 000 ha of the agricultural land is cultivated. It is estimated that about 8% is irrigated whereas the rest depends directly on rainfall. The annual average rainfall is about 550 mm of which the effective rainfall is 300 mm / year. Considering that the rainy season normally extends from September to March, vegetables and summer field crops are impossible to grow during the dry season ranging from April to August, unless irrigation is applied.

1. Agricultural Holdings

Agriculture accounts for 3% of the Gross Domestic Product (GDP) and 2% of employment.

Malta is self sufficient in fresh vegetables, pork, fresh milk and fresh eggs. The number of full-time farmers is constantly decreasing and accounts only about 1000 plus about 400 full time livestock breeders. The reason for this decrease is mainly due to the subdivision of the holdings as a result of inheritance. When the holding is subdivided from generation to generation it is no longer viable to sustain a living. This trend however does not seem to have a negative effect since the agricultural land is being well cultivated on a part-time basis. This subdivision of the holdings is however creating problems of fragmentation resulting in several fields or rather individual plots of land in the same fields.

2. Soil Aspects

Malta's agricultural land is characterised by the sloping terraced fields bounded by retaining rubble walls. These are very often, shallow soils normally ranging from 20 to 75 cm depth. There are also a few flat areas near valley beds which are very fertile such as at Pwales (Ghajj Tuffieha) and Burmarrad. These soils are of sediment origin and are over a metre deep but overlie a saline aquifer.

It is estimated that land areas under forage production total around 4500 ha. Production of fresh fruit and

vegetables is about 75 000 tons of which 6000 tons is fruit. This is all raised under conventional methods both in the open field and under plastics.

Livestock production totals around 40 million kg of fresh milk, 11.2 million kg of pork, and four million kg of broilers and 5.5 million eggs each year.

The main soil types are:

- (i) Terra Rossa Soil, red soils found on coralline limestone in the North (Mellieha) and in the South East (Kirkop / Zurrieq);
- (ii) Xerorendzina soils overlying blue clay rock in Rabat areas;
- (iii) Carbonate raw soils, white soils with high calcium carbonate.

However, over the years there has been an extensive movement of soils from one area to another for agricultural land reclamation and addition of soil to existing shallow fields. Hence, it is common to find a mixture of soil types in the same locality and even in the same field.

Water permeability in soils vary tremendously depending on the soil type, very low on clay soil to very high in terra rossa soils. Water retention is high only in clay soils and very low in all other soils. Considering the low soil depth of most of the terraced fields, soil water storage is quite low and, hence, there is a need for frequent irrigation sometimes even during the rainy season.

3. General Aspects

Organic Agriculture in Malta was not heard until a few years ago. However, in the last five years there has been a great interest in this subject, now that most people are conscious of the need to protect the environment and to consume healthy food. Farmers and growers have also shown limited interest in raising crops with controlled applications of chemical fertilizers and pesticides.

The first commercial attempt to grow crops organically was about four years ago when it was said that an organic soil conditioner can be sprayed on the field and all chemicals present in the soil would be neutralized. Few crops like tomato, potato, vegetables and melon were grown on various plots of land as a trial. However, since no organised marketing system of organic production has been set up, this production had to be discontinued as financial

returns did not justify the added expenditure of treating the soil.

Recently a voluntary organization called Malta Organic Agriculture Movement (MOAM) was set up by some individuals who are attempting to create awareness towards organics. It seems that they are facing a difficult task to convince farmers and growers to convert into organics. This is understandable when taking into consideration the characteristics of the agricultural activity in the Maltese Islands, that is, the marketing system, land, fragmentation, lack of land, absence of organic matter in soils, non rotation systems of production and pest and disease persistence in a warm Mediterranean environment.

4. Regulatory Aspects

No regulation framework is present in Malta.

5. Structural Aspects

There are only some trial plots organically farmed.

6. Productions

Trial plots exist for the growing of vegetables such as lettuce and tomato, fruits such as melon and water melon, and some vines.

7. Agronomic Aspects

The main constraint relating to the management of soil fertility is the lack of organic manures produced in livestock farms. Moreover, due to the huge number of small holdings and lto the ack of agricultural land, crop rotation and green manuring is hardly practised. Organic fertilizers which have to be imported are not readily available.

Due to the intensive farming and to the lack of rotation, persistent pests diseases, viruses and weeds are the major problem in the Maltese agriculture. Very little biological control of some pests is practised.

All synthetic fertilizers and pesticides normally commercialized in other countries can be imported. Constraints do exist to the importation as long as the normal procedures are followed.

All imported seeds or plants have to be sanitary certified.

Government institutions and private companies or individuals produce technical information (but in organic agriculture).

8. Marketing aspects

Marketing of organic products is not yet developed.

MOROCCO

Lahcen Kenny

Institut Agronomique et Vétérinaire Hassan II - Agadir

Introduction

In Morocco, there are two main sectors in Agriculture: a traditional one for rainfed crops, mainly cereals and legumes, and a relatively modern one for irrigated crops mainly those oriented to export. Irrigated crops include vegetables, ornamental plants, flowers and fruit trees.

Traditional farming systems with low external inputs and no or few chemicals are widespread in all parts of the kingdom. In the northern part of the country, the main commodities are cereals, legumes and non-wood forest products (i.e. mushrooms). In the central part, medicinal plants, temperate fruit trees (apple, pear and cherry) and subtropical species (fig and pomegranate) are the dominant crops. The eastern, southern and south-eastern parts are characterized by an arid and semi-arid climate with very few rainfed crops. In these areas vegetables and fruits are mostly under irrigation using surface water in some remote areas and dam or underground water in modern farms. The agricultural scene in south of Morocco is also famous for its endemic species such as argan, date palm and caper.

1. General aspects

In Morocco Organic agriculture was launched in 1986 in Marrakech area by citrus growers with the help of some French farmers. Today, the concept of organic farming and production has gained more regions. Farmers in Agadir, Marrakech, Azemour and Benimellal regions are currently involved in one aspect or an other of organic production.

Organic commodities come from both cultivated and wild plantations. The latter is so far predominant in terms of surface. Organic production from cultivated crops was first initiated by a French and some Moroccan growers in Marrakech area (South of Morocco) and concerned only citrus. From 1986 to 1992, the progress was very slow, but in 1993 a larger experience was launched by few citrus and vegetable growers first in Marrakech and later in Agadir.

Today, there are around 1000 ha of organically cultivated crops and 7000 ha of natural forest such as argan and some medicinal plants.

2. Regulatory framework

Two ministerial laws concerning organic agriculture were promulgated in 1992:

- law no. 02/92 was promulgated by the EACCE (Etablissement Autonome de Controle et de Certification des Exportations) and it concerns the technical control of organic labelled export-oriented products
- law no. 1434 of 3 August 1992 promulgated by the DPVCTRF (Direction de la Protection des Végétaux et de la Répression des Fraudes), the competent authority normally in charge of certification and inspection in the field of Agriculture. This law was just a summary of the European legislation on organic farming and was not recognized by the EU authorities.

Even though the activity of organic farming in Morocco is 14 years old, the country has issued a national regulation only in 2002. This regulation is now published in French under the title: "Norme Marocaine de la Production Biologique".

Due to the absence of regulation and because neither DPVCTRF nor EACCE have so far developed the competence and prerogatives needed for the control, certification and inspection are carried out all over Morocco by foreign companies. Four multinational companies share the Moroccan market: ECOCERT, Qualité-France, Biosuisse and GfRS (Gesellschaft fur Ressourcenschutz mbH). The latter is acting as a co-certifier with an Austrian company. The personnel involved is Moroccan in the case of the French companies and German in the case of GfRS. Addresses of the inspection boards are given bellow:

- Gesellschaft fur Ressourcenschutz mbH

Prinzstraße 4

37073 Gottingen

Germany

Phone 0551-586-57

Fax 05 51-587 74

- Ecocert

BP 47 32600

L'Isle Jourdain

France

Tel 0562073424

Fax 0562071167

- Qualité- France

18, rue Volney - 75002

Paris, France

Phone: 01.42.61.58.23

Fax: 01.4260.51.61

- Biosuisse

Margarethenstr, 87

CH-4053 Basel

Tel 00 41 061 385 N96 10

Fax 00 41 061 385 96 11

website: www.bio-suisse.ch

e-mail: bio@bio-suisse.ch

3. Structural aspects

3.1 Number of farmers

According to internal documents of national NGOs and certification bodies, 61 persons take part in the organic production movement in Morocco. These are producers, exporters, processors or traders. This figure is, however, far under-estimated because many producers working with wild plantations (argan and medicinal plants) are not included. According to our proper investigation another 500 men and women are involved in collecting organic products from wild plantations. Therefore, the total number of persons involved in organic production is about 555 (table 1).

3.2 Overall surface

The overall cultivated and wild certified organic area is about 11 956 ha of which 35% is under conversion. The main production comes from wild plantations particularly argan. Except for some medicinal plants collected in the Atlas forest under temperate climate, all the other products are collected or grown in the central and southern part of the country characterized by a semi-arid and arid climate. Details on the surface according to areas and commodities are given in table 2.

3.3 Production

In Morocco non-cultivated crops represent 75% of the total organic production (table 2). Cultivated crops including

citrus, olive, vegetables, medicinal and aromatic plants (MAP) are destined to the European and American markets.

3.3.1 Citrus

Organic production of citrus commodities initiated in 1986 by some growers in Marrakech area. The main areas of production are currently Marrakech (150 ha) and Agadir (100 ha). The main varieties are Clementine, Washington Navel, Lemon, Washington sanguine and Salustiana. The whole production is oriented toward export.

According to some commercial agents, Moroccan products are well appreciated in Europe and are sold at prices varying from 6-7 FF/kg which is 20 to 30 % more than what is offered for products coming from other countries.

The main period of export goes from December to May. Exceptionally, the period can be extended to June-July if storage is ensured for late products. According to ProNatura, a french company specialized in marketing of organic products, in Morocco there is a prospect to export more organic oranges in winter and late spring, even though a strong competition of other Mediterranean countries has taken place on the European market. This assumption is based on two considerations: (i) in winter time, there is a gap of one month (February) during which organic fruits are not available on the European market; (ii) since late producing varieties are not available in Europe, in summer time demand is met by South American products.

3.3.2 Olive

Attempts to export organic olive oil and fruits have been done since the eighties, but the activity is still limited to two regions (Taza and Taroudant). According to the certifying companies (Ecocert and Qualité-France) the total certified organic surface has reached 120 hectares representing 0.02% of the total olive surface in Morocco (455 000 ha).

3.3.3 Vegetables

Organic production of vegetables was launched in 1994 with few species. By 2000, around 1500 tons of eight commodities were produced in three different areas: Agadir, Taroudant and El jadida. The production is mainly oriented toward export (table 2). Tomato represents 43% of the production, cucumber and carrot 37%. Organic vegetables are grown under plastic houses during winter season in order to meet the European off-season demand. Most of the farmers use drip irrigation, soil mulching and biological tools to control

pests and diseases. Over the last five years, production of organic vegetables has become popular in Agadir where the biggest community of vegetable growers is located. From 1997 to 1998 the total surface allocated to these crops trebled and the trend seems to steadily increase (Table 3).

3.3.4 Medicinal and aromatic plants (MAP)

Cultivated MAP represent 16% of the total organic production. About 20 species are cultivated in certified farms in four areas: Rabat, Marrakech, Taroudant and Agadir (figure 1). These are: rosemary, menthe, thymus, verbena, salvia, cumin, oregano, coriander, common oleander, eucalyptus, fennel, lavender, marjoram, basil, pine, strawberry, chamomile, peppermint, citronella, aneth, violet, absinthe, mugwort, mayweed, savory, angelica and hyssop. Saffron is produced solely in Taliouine, a remote area in the Southwest of Morocco.

3.4 Collection of wild products

3.4.1 Argan

Argan is an endemic tree to Morocco covering a total area of 830 000 ha of which 4000 ha are organically certified by French and German agencies. The main areas of production are indicated in figure 1. Argan fruits are traditionally collected by the local population and are used for the extraction of a valuable oil from the seeds. Three main companies are working in this sector: a private company based in Casablanca and covering Aoulouz area, a local association of women covering Agadir and Essaouira areas and a third company based also in Casablanca and covering parts of the forest in Essaouira.

Argan oil is extracted in a five - step process: (i) nuts extraction; (ii) heat treatment; (iii) grinding; (iv) paste pressure and (v) oil purification.

Two types of oils (or oil quality) are produced: (i) a regular oil extracted in a traditional way exclusively used for consumption and (ii) a highly purified oil extracted without heating (cold extraction) reserved for cosmetic uses.

The German government, through its international agency (GTZ), launched in 1994 a project for the development of organic production of argan in the Southwest of Morocco. The main objectives of this project were to establish a network of rural cooperatives of women specialized in organic production of argan oil. Thirteen cooperatives with 376 women are involved in this network. A similar approach

was undertaken by a Canadian NGO which contributed to the creation of another women cooperative in Tamarar area (SouthWest of Morocco).

3.4.2 Medicinal plants

More than 25 000 Kg of medicinal plants and plant extracts (conventional and organic) were exported in 1998, 70 % of which are certified. The Atlas forests (Ourika and Azrou) are the main sites where most of the wild medicinal plants are collected. The main species are: thymus, eucalyptus, rosemary, salvia, matricaire and absinthe. Other species are collected from arid and semi-arid land such as Ourazazate and Errachidia (East of Morocco, figure 1).

3.4.3 Processed products

There are three types of organically certified processed products: green bean, caper and olive oil. Green bean and olive oil are processed by private companies based in Casablanca and Taza Area, respectively; caper is processed by both farmers and industrial units in Fes and Meknes.

3.4.4 Foreign investments

European businessmen and farmers have been involved in the organic sector in Morocco for many years at several levels: (i) production: Belgium and Italian growers own and manage production units specialized in medicinal plants and citrus; (ii) certification: four European companies act as certifiers (see regulatory aspects) and (iii) market: a French company (Pronatura, see Marketing aspects) is involved in exporting and marketing Moroccan products.

3.5 Producers' associations

There are two professional associations: Maghrebio and APFB (Association des Professionnels de la Filière Biologique) . The latter is the largest one with 44 members including 19 producers, nine industrials (packaging and canning), 12 salesmen and nine administrators and certifiers. Maghrebio is based in Marrakech and has 17 members including six producers; the rest are either industrials or certifiers.

- Association des Professionnels de la Filière Biologique (APFB)

30 Rue Abou Ishak El Marouni

Maarif, Casablanca

Tel: +212 2 25 21 18 / 99 40 29 / 23 05 81

Fax: +212 2 23 07 61

- Maghrebio

Immeuble Gidel, 127 Av. Mohammed V, Marrakech

Tel: +212 44 43 97 26

Fax: +212 44 43 97 26

E-mail: maghrebio@iam.net.ma

3.6 Research and training

All initiatives (education, training and extension activities) are mostly carried out by public institutions, farmers and some international bodies. Until 1997, very few activities were undertaken by governmental institutions to promote organic agriculture in the country. In 1995 the CMPE (Centre Marocain de Promotion des Exportations) organized some seminars in Agadir and Rabat to promote export of organic products to the European market.

In 1997, the "Institut Agronomique et Vétérinaire Hassan II" (IAV) has launched a program on research and training on organic farming. IAV is the largest Institute for research and higher education in the field of agriculture in Morocco. It has 1200 students and 330 faculty members with two campuses, the main one in Rabat and a second one in Agadir.

Since 1997, the Department of Horticulture in Agadir has integrated a course on organic agriculture in the fifth year of the Master program. Research thesis on organic production of medicinal plants and biological control of insects have also been developed in the departments of Horticulture and Plant Protection. Since 2000, some IAV's students have been participating each year to a post-graduate and Master program launched by the Mediterranean Agronomic Institute of Bari (IAMB).

4. Agronomic aspects

4.1 Management of soil fertility

In olive orchards, the common practice used for soil management consists in leaving the soil without ploughing. Weeds are left on site and are used as organic matter. Few farmers practice cereal intercropping in olive orchards.

In citrus growing, soil is ploughed twice a year: at the beginning of the rainy season (October) and later in February. Intercropping with legumes in heavy soil and Medicago species (Alfalfa) in sandy soil are common practices applied in Marrakech. Manure is the main source of fertilizers. Up to 30 tons per hectare are spread in-between the rows at the end of winter, right after harvest.

Organic fertilizers are not commonly used neither with citrus nor with olive.

In general, fruit producers are facing various problems in the management of soil fertility. The total amount of nutrients available in organic orchards is far from the optimum, and this is due to: (i) the low amount of manure added annually; (ii) the lack of organic fertilizers added to the soil or applied as foliar treatment and (iii) the absence of legumes intercropping. Consequently, the yield is far from the optimum.

Vegetables are grown under plastic house and most of organic growers have more than 10 years of experience in this field. Therefore, they are generally well acquainted with technical constraints and crop requirements. Soil fertility is managed through three types of actions: (i) manuring, (ii) the use of non synthetic fertilizers and (iii) foliar application of some amino-acids and organic compounds.

The amount of manure applied vary from 15 to 60 tons per hectare according to the crop requirements. For most vegetables, well decomposed bovine manure is applied directly to the soil around the plant. For tomato, a special practice is undertaken by some farmers: it consists of mixing manure with water (1:1 volume) and releasing it in a soluble form with irrigation. Other organic fertilizers are also used at different concentration rates according to the crop requirements and to the stage of growth (table 4).

4.2 Disease, pest and weed management

The main pests and diseases of citrus are California Red scale, Mediterranean fruit fly (*Ceratitis capitata* Weid) and aphids. To control California Red scale and aphids, a commercial product (Neemix) mixed with mineral oils is used. Fly traps are the only mean to biologically control the Mediterranean fruit fly.

For vegetables, several pests and diseases are reported. The main pesticides used are presented in table 5. Biological control of insects is also quite common. More than 70 biological agents are authorized by the Moroccan legislation, law no. 2548 of April 1, 1998 (annex 2). However, the most frequently used biological agents are those reported in table 6.

4.3 Propagation material

Seed vegetables are imported from Holland, Spain and sometimes from Israel. Varieties used in organic production are often the same of conventional; therefore, seeds are produced solely by international companies. However, many sale companies are now offering non-treated seeds for organic production.

In olive and citrus growing, propagating material is the same used in conventional. The main producers are specialized nurseries located in Meknes and Marrakech areas. Plants of the main varieties cultivated in Morocco are produced by semi-herbaceous cuttings in spring and summer in the case of olive and by budding in the case of citrus. Certified virus-free material is available for citrus but not for olive.

4.4 Constraints

The management of soil fertility is a serious problem in most organic farms, particularly in remote areas where farmers with no basic training in organic farming are not well acquainted with agronomic and microbiological benefits of organic fertilizers.

Few organic fertilizers and pesticides are available on the market with high prices compared to conventional. According to commercial agents the problem is related to the homologation system adopted in the country: a new product imported from abroad needs two to three years to be homologated.

For technical advices, some producers are collaborating with foreign consultants from France, Holland and Italy. The cost is, however, very high.

5. Market aspects

All organic products are oriented toward export (tables 7 and 8). Vegetables and citrus represent 95% of the total quantity exported to Europe. France, UK and Germany are the primary destination for Moroccan products. The national market of organic commodities is still so far absent.

In Morocco export is done through two types of channels: (i) through dealers operating on the foreign markets (mainly for vegetables) and (ii) through a specialized French company (Pronatura) based in Marrakech. According to Pronatura agents, prices offered for organic products are 20 to 30% higher than those of conventional products. The demand is particularly high in winter. Pronatura recommends its clients a late production for which the European demand is not yet satisfied. The market for vegetables and citrus,

as shown in table 7, has increased during the last three years. According to APFB's president, tomato export alone will reach 9000 tons in 2001.

TUNISIA

Mohamed Ben Kheder

Centre Technique de l'Agriculture Biologique - Sousse

1. Characteristics of organic agriculture

Organic agriculture is relatively new in Tunisia. The main productions are olive, date palm, almond, jojoba, vegetables, fruit trees, aromatic plants and honey. All the production is directed to the export market. Organic farms are mainly located in the centre and in the southern part of the country.

Many agricultural areas and crops can be easily converted to organics because of many factors: (i) unfavorable climatic conditions to pests and diseases; (ii) traditional techniques and practices and (iii) biodiversity. The main difficulties in converting to organic agriculture in some areas are related to the lack of: (i) products for fertilization and soil amendments; (ii) products for pest and disease control; (iii) unrestricted veterinary medicines and (iv) experience in marketing organic products.

2. General aspects

Organic agriculture started in Tunisia in the eighties with private initiatives. It had a slow evolution until the last three years which were characterized by a high increase in area and number of farms. In 1997, there were about 10 farms covering a surface of 300 ha. In 2000, they became about 137 farms over a surface of 15 035 ha. This increase is due to the development of some policies supporting this sector underlined in the national strategy:

- Aids: 30% of subsidies for all equipments used in organic agriculture and 70% for certification fees during the first five years of production with a maximum of US\$ 3500.
- Information: the "Centre Technique de l'Agriculture Biologique" (CTAB), the "Sous-Direction de l'Agriculture Biologique - Ministère de l'Agriculture" and the "Agence de Promotion des Investissements Agricoles" (APIA) offer technicians and farmers all the information related to various aspects of organic agriculture.
- Training: the CTAB in collaboration with the "Agence Nationale de Vulgarisation et de Formation Agricole" (AVFA), the "Institution de Recherche et d'Enseignement Supérieur Agricole" (IRESA) and the Mediterranean Agronomic Institute of Bari (IAMB) organize many training activities

(short sessions and courses) on various topics of organic agriculture addressed to technicians and farmers. Some modules on organic agriculture are also offered at university level.

- Marketing: some subsidies are given by the Centre de Promotion des Exportations (CePEX) to facilitate the marketing of organic products.

3. Regulatory aspects

The reference legislation in Tunisia is the IFOAM Basic Guidelines, EEC and the Tunisian regulations. A national regulation (law no. 99-30) was issued in April 5, 1999 followed by decree no. 2000-409 in February 14, 2000.

A reference regulation on organic agriculture is available at national level only for plant production.

The complete national regulatory framework will be ready by the year 2001. The last version of the national technical standards on plant and animal production and processing is being prepared.

The competent authority is the Commission Nationale de l'Agriculture Biologique (CNAB). Its main tasks are: (i) to prepare proposals for organic agriculture promotion and support; (ii) to study all files and documents related to organic agriculture and (iii) to approve or withdraw certification bodies.

The inspection and certification system comply with the IFOAM standards, EEC regulation and the Tunisian legislation. The inspection and certification bodies are the following:

- Institut National de la Normalisation et de la Propriété Industrielle - INNORPI (Tunisian) in cooperation with BIOAGRICOOOP (Italian): the personnel (mainly inspectors) is Tunisian and Italian. They inspect 9% of the total organic area;

INNORPI, Rue Alain Savary, Cité El Khadra,
1003 Tunis Belvédère, Tunisie

Tel: +216 1 785 922 ; Fax: +216 1 781 563

E-mail: inorpi@email.ati.tn

- ECOCERT International: inspectors are mainly Tunisian. They inspect 90% of the total organic area;

ECOCERT International, Förster Str 87, D-37520 Osterode, Germany

Tel: +49 5522 651161; Fax: +49 5522 951164

E-mail: info@ecocert.de

ECOCERT Tunisie, 35A complexe Elmanar, rue Habib Thameur,
3000 Sfax, Tunisie. Tel: +216 4 225 458 ; Fax: +216 4 297
602

- LACON, BCS (German): inspectors are German and inspect 0.7% of the total organic area;
- AIAB (Italian): inspectors are Italian and cover 0.3% of the total organic area.

4. Structural aspects

By 2000, there were 15 035 ha of organically farmed area and 137 farms of which 90 are certified (12 400 ha), 43 in conversion and 4 mixed (organic and conventional). Processing units were 15 distributed over a surface of 5 ha. Productions are reported in table 1.

Most of organic farms and processing units are located mostly in the centre and the south and few in the north of the country.

Future prospects (2002-2006) :

- Area : 22 000 hectares
- Vegetable production : 135 000 tons
- Milk : 5000 liters
- Eggs : 4 000 000
- Meat : 100 tons

No organic farms are owned by foreign companies. Two farms (350 ha) are run by both Tunisian and foreigners.

4.1 Producers' associations

- Fédération Nationale des producteurs Biologiques
Union Tunisienne de l'Agriculture et de la Pêche
Rue Alain Savary, Cité El-Khadra 1003 Tunis, Tunisie.
Tel: +216 1 800 800 ; Fax: +216 1 798 598

Number of members : 137 organic farmers

Products: see table 1

Activities carried out: organization, information and support.

- Société Zayatine

Immeuble Abid, no 101 Avenue d'Algérie, 3000 Sfax, Tunisie.

Tel: +216 4 212 241; Fax: +216 4 221 755

Number of members : 23 from the 137 organic farmers

Products: olive oil (1 000 000 kg) and almond (15 000 kg)

Activities carried out : organization, information and marketing

- Other farmers' associations are being established.

4.2 Research

4.2.1 Structures

There are ten national research committees under the umbrella of IRESA dealing with various aspects of agricultural research: conventional and organic. They set up the priorities for research topics. Research is done by both research institutes and university.

4.2.2 Research topics

The major lines are: (i) variety testing (vegetables); (ii) compost quality; (iii) use of various organic matters (farm by-products and manure); (iv) cultural practices (grafting); (v) disease and pest control (olive, date palm and vegetables) and (vi) animal production techniques.

4.3 Training

Some modules on organic agriculture are given to agricultural technicians and engineers in different agronomic institutes.

CTAB in collaboration with AVFA organize training sessions of one day or more for technicians and farmers on different topics of organic agriculture.

5. Agronomic aspects

5.1 Soil fertility

In Tunisia soil is generally poor (low organic matter content, low biological activity and poor structure). The main problems of soil fertility improvement are related to (i) the introduction of green manure in rotation programmes; (ii) the training of farmers on compost management (of different organic matter origins) and (iii) the finding of authorized organic and mineral fertilizers (in sufficient quantity) in the country.

5.2 Pest and weed control

The control of some pests and diseases is not efficient because many authorized products cannot be found in the

country or are not yet registered. In this respect, a preparation of a list of registered products is underway.

A rational crop rotation for a good weed control is not always followed by the farmers.

Working towards the biological equilibrium and biodiversity restoration should be a must.

5.3 Technical means

There are some constraints to import technical means. These are the following:

- a complete list of recorded inputs authorized in organic agriculture is still lacking;
- the import of organic matter is still prohibited;
- equipments used in organic agriculture (i.e. compost and weed management) are not well known by the farmers.

5.4 Main authorized material for soil fertilization, protection and processing

- local organic matter;
- natural minerals allowed by EEC regulation;
- sulfur products;
- copper products;
- mineral oils;
- *Bacillus thuringiensis*;
- Pheromones in traps;
- methaldehyd in traps;
- local natural predators and enemies (i.e. beneficial insects);
- additives and processing aids allowed by EEC regulation.

A complete list of authorized material is being prepared.

5.5 Propagating material

Seeds, seedlings and other propagating material used in organic agriculture are both local and foreign, either organically certified or just not chemically treated. Olive and date palm were planted long time ago.

5.6 Local companies

Producing technical means are rare. There is only one company producing compost. Production of local predators is done by an experimental station.

New projects are underway.

6. Market aspects

There is not yet a local market for organic products in Tunisia. Some organic products are sold as conventional. A strategy is being prepared to encourage local consumption and marketing. Most of the production is directed to the export market and sold as typical Tunisian products. Types and quantity of exported organic products are given in "structural aspects".

The main foreign markets and the relative products are:

- Italy and Spain: Olive oil;
- France and Germany: Dates;
- France and Great Britain: Vegetables;
- Switzerland: Jojoba;
- France: Aromatic plants and Wine.

Most of the farmers are producers and exporters and they export their production by themselves. A farmers' association, the "Zayatine", groups 23 farmers and exports their production. Few farmers have contracts with exporters.

The marketing of some organic products (i.e. olive oil) is still difficult. The main export constraints are based on the lack of (i) market assessment and a marketing plan (evaluation of opportunities, future demands and prices of organic products) and (ii) efficient regional and national marketing networks of organic products.

The promotion of organic production is done through the participation at national and international fairs.

The main barriers to have access to international markets are:

- authorization from European authorities;
- lack of information;
- European labels (like AB in France);
- small quantities of organic products.

At the moment, there aren't organizations dealing with the marketing of organic products but the efforts made to organize the marketing of organic oil, led to the establishment of Organic Olive Oil, a new oil marketing society.

7. Development of Mediterranean organic

agriculture

The major needs for the development of Mediterranean organic agriculture are the following:

- specific and appropriate Mediterranean regulations;
- training for technicians and farmers;
- establishment of farmers' associations;
- establishment of marketing organization;
- supply of organic fertilizers and authorized products to be used in plant and animal protection.

TURKEY

Uygun AKSOY

Ege University - Izmir

1. Characteristics of organic agriculture

Organic production in Turkey is mainly driven by the export market. According to the figures in 2000, dried fruits and nuts have the largest share in organically grown crops with a percentage of 65.8%, followed by field crops (17.5%), fresh or processed fruits (9.5%), vegetables (1.9%), berries (1.3%), medicinal and aromatic plants (1.4%) and others (2.6%). 18 375 organic farmers produce 95 different crops on an acreage of 57 001 ha. Total organic production reached to nearly 220 000 tons in 2000. The demand from the local market started recently during the last few years. There is an urgent need to widen the product range and include fresh fruits and vegetables, wheat and flour for bread and pasta industry, meat and milk and their products in order to meet the demand of a Turkish household and develop the internal market. Continuous information flow of technical advice and market information must be provided to the farmer. The crucial issue to initiate the production of new crops is to establish the bridge between the farmer and the consumer. Inputs used in organic farming and proven satisfactory under the prevailing conditions like beneficial insects, plant extracts or soil amendments must be available at a low cost. Organic agriculture in Turkey is in an increasing trend as could be seen in Figure 1, however, most of the production comes from the traditional commodities and are destined for exportation.

2. General aspects

In Turkey, organic production started in 1984-85 with the demand of European companies interested in organically grown traditional crops such as dried fruits and nuts. During this period, the companies received consultancy from the European firms. During the last 5-8 years, the demand increased for new products and even if the product range is increasing the quantities are limited. To further the development of organic agriculture in Turkey, different sectors have different needs and functions. These urgent needs can be classified under three headings: training, research and market development of organic inputs and products.

There is no policy to support farmers, yet. Even if the rate is decreasing, fertilizers and agrochemicals are still

subsidised, however foreseen to be ended by 2001. There are some training and research activities supported by the Ministry of Agriculture and Rural Affairs (MARA) and by ETO, the Turkish Association on Organic Agriculture (Ekolojik Tarım Organizasyonu Derneği). Training activities are carried out since 1996 and mainly addressing to the technical staff of the state extension services. The senior extensionists in each of the 81 provinces attended a one-week seminar once or twice. During the last four years, about 520 agricultural engineers had two-week training courses under the framework of a project supported by the State Planning Organization. Nearly half of the participants came from MARA and the other half were unemployed agricultural engineers. Lately, advanced courses are being organized to the researchers at the research institutes of the MARA.

The Turkish Scientific and Technical Research Council, a state funding agency announced organic farming as a priority area. The State Planning Organization, MARA and research funds of the universities are also supporting research projects on organic agriculture. The institutions and researchers involved in organic agriculture is increasing every day. A research network was established within MARA but is not very active.

Activities to introduce organic agriculture to a wider group are being carried out by ETO, Ege University Faculty of Agriculture and MARA. Conferences, panel discussions and seminars are held in different parts of Turkey.

3. Regulatory aspects

3.1 Reference legislation

A national regulation (ETK 22145) for organic plant and animal production based on EEC Regulation 2092/91 and IFOAM Basic Standards was issued on December 18, 1994. It is at the final stage of revision to cover the aspects related to animal production, processing and labelling. In general, it is based on EU and Codex standards.

3.2 The competent authority

The competent authority for organic agriculture is the Committee on Organic Agriculture (ETK) at MARA. ETK composes of representatives coming from different general directorates of MARA. The Committee secretariat is located at the Department for Research, Planning and Coordination (APK Department).

3.3 Inspection and certification system

The inspection and certification activities are carried out by independent bodies authorized by the MARA. Farmers can apply to inspection and certification bodies individually or together as a group through the contracting company. In order to function in Turkey, the inspection and certification bodies have to apply MARA, present all the documents required as stated in the national regulation and get authorization.

3.4 Inspection boards

There are seven inspection bodies in Turkey. Six of them are Turkish branches of foreign companies (BIOAGRICOOOP, Bio Control System (BCS), ECOCERT, Institut für Market Ökologie (IMO), INAC and SKAL) and the seventh one is a local one (table 1). All inspection bodies have to have a minimum number of Turkish personnel and an office according to the national regulation ETK 22145.

4. Structural aspects

In Turkey, average farm size is rather small and the plots are divided. The average size of an organic farm is 3.1 ha. Organic farming is generally practiced as contracted farming since from the very beginning the exporters had to search for farmers who would be willing to produce according to organic rules. The contracting company supports the farmer by paying the inspection and certification cost and provides technical advice. In 1999 there were 12 435 organic farmers and 44 552 ha while in 2000 organic farmers increased to 18 375 with a surface of 57 000 ha (table 2).

There are 38 processing units distributed as follows: 30 units in Izmir, two in Ordu, one in Trabzon, one in Mersin, one in Malatya, one in Antalya, one in Afyon and one in Mugla. Wild products picked from the nature are: rosehip, garden sage, laurel, myrtle, thyme, rosemary, wild prune, lime, mulberry and cornelian cherry. Their production vary between 10 and 500 tons (table 3).

No farm is run or owned by foreign companies. They generally carry out organic production under a contract and give the technical advice. There are two farmers' cooperatives in Turkey involved in organic production, TARIS and BASMAKCI. TARIS, the biggest farmers' cooperative in Turkey produces organic dried figs and raisins and is about to start dealing with olive oil and cotton. Among TARIS members, the total number of organic fig farms is 160, that of olive 170 and that of vineyards 89. The total number of members in TARIS is 116 182 (Cotton growers: 55

967, Olive growers: 26 918, Grape growers: 25 424 and Fig growers: 7873). Basmakci is situated in Afyon in the eastern part of the Aegean Region and the cooperative produces organic and biodynamic rose and its products and sesame seeds for the export market.

5. Agronomic aspects

5.1 Soil fertility

Surveys must be carried out in different parts of the country to determine the raw material available for composting. Suitable and practical methods of green manuring and composting must be developed and introduced to farmers. Research work on methods promoting the mineralization of nitrogen and cycling of organic matter in the soil need to be carried out and/or to be put into practice.

5.2 Pest and weed management

There are many research activities on biological and biotechnical methods for pest, disease and weed management. An overall evaluation of the results in order to put forth a complete and integrated approach is necessary. Adaptation trials of the results obtained in other countries under relevant conditions must be fulfilled. Some of the techniques can be easily imported. Preparations permitted in plant protection must be tested under regional conditions and results must be integrated into the present programs. A new concept has to be developed for weed regulation (not for control).

Authorized materials are mostly imported and certified by inspection and certification bodies. Even if limited, there are some local companies which produce technical means such as copper, sulphur and attractants.

5.3 Technical means

The following are some constraints to import and availability of technical means: (i) difficulties in registration of preparations; (ii) complexity and length of the identification process of a product presented as convenient to organic farming; (iii) the need for the adaptation tests of certified preparations to be performed under local conditions and (iv) absence of an official body for the testing or registration for conformity to organic farming.

5.4 Propagating material

There is only one local organic nursery for few fruit species (apple) and an attempt to produce seeds of few vegetable species as tomato and pepper. All the other propagation material comes from the conventional market or the organic farmer produces his/her own seeds. Propagation material of fruit trees is generally local and possess a sanitary certificate. Most of the vegetable seeds are of foreign origin.

6. Market aspects

6.1 Organization of the local markets

Greater part of the products is sold in specialized shops (ca 50 points) in the main cities. In big supermarkets there are corners in which organic crops are sold but the product range is rather limited. Only one company has a mail order selling system.

6.2 Type of product and quantity

Almost all of the Turkish organic products are dry or processed food or non-food commodities with a long shelf life providing ease in post-harvest and marketing stages. Totally 92 different organic crops are available for both local and foreign markets. These are categorized as 99 700 tons of dry and dried fruits, 8000 tons of fresh fruits, 2700 tons of vegetables, 33 000 tons of field crops, 2400 tons of berries, 3200 tons of medicinal and aromatic plants and 10 600 tons of other crops. During the last years there is an increase of processed products.

6.3 Main foreign markets

Germany (61%) is the major market followed by the USA (15%). England (5%) and other EU or non-EU European countries have shares ranging between 2-3%. The main commodity group is dried fruits and nuts. According to the national regulation, all goods produced and exported as organic need to be declared to the exporters' union. The Aegean Exporters' Union in Izmir is responsible to collect all the information from the other regions.

6.4 Difficulties encountered

There is no difficulty in exportating dried fruits and nuts since Turkey is the major producer country. For fresh fruits and vegetables, the most important constraint is the transportation cost and short shelf life.

6.5 Consumer demand

According to a public survey made on 1000 consumers by Ege University, Faculty of Agriculture, consumers are ready to

buy organically grown products in the three biggest cities of Turkey, Istanbul, Ankara and Izmir. However, the price of the products is still relatively higher than that of conventional ones. The consumers are ready to pay more on certain products as greenhouse grown tomatoes that they believe contain hormones or pesticides than others.

6.6 Future plans for promoting organic agriculture

New attempts to promote organic agriculture in Turkey are being scheduled by MARA, ETO and the Exporter's Union. National symposia are being held every two years since 1999. Fairs represent other opportunities for promotion. The Center for Promotion of Exportation gathers information on organic production and companies involved in exportation and publicizes through its website (www.igeme.org.tr) or pamphlets.

List of Abbreviations and Acronyms

AA	Agricultural Area
ACC	Agriculture Commodity Council
AE.N.O.P.	Agroenvironmental Network of Organic Producers of Western Greece
AGDP	Agricultural Gross Domestic Product
AIAB	Associazione Italiana per l'Agricoltura Biologica
AMAB	Associazione Mediterranea Agricoltura Biologica
APFB	Association des Professionnels de la Filière Biologique
APIA	Agence de Promotion des Investissements Agricoles
AQB	Associazione per la Qualità del Biologico
AUB	American University of Beirut
AVFA	Agence Vulgarisation et de Formation Agricole
AWP	Agricultural Working Population
BCS	Öko-Garantie Control System
CAEG	Cretan Agri-Environmental Group
CAP	Common Agricultural Policy
CCP	Control Critical Point
CCPB	Consorzio per il Controllo dei Prodotti Biologici
CEDAS	Centro Documentazione Agricoltura Sostenibile
CePEX	Centre de Promotion des exportations
CIHEAM	Centre International de Hautes Etudes Agronomiques Méditerranéennes
CMPE	Centre Marocain de Promotion des Exportations
CNAB	Comission Nationale de l'Agriculture Biologique
CNRAB	Centre National de Ressource en Agriculture Biologique
CNRS	National Centre for Scientific Research
COAE	Centre of Organic Agriculture in Egypt
CPRA	Centre de Perfectionnement et de Recyclage Avicole
CTAB	Centre Technique de l'Agriculture Biologique
CTPB	Coordinamento Toscano Produttori Biologici
DGAL	Direction Générale de l'Alimentation
DGPA	Direction Générale de la Production Agricole
DIO	Certification and Inspection Organization of Organic Products
DPVCTRF	Direction de la Protection des Végétaux et de la Répression des Fraudes
EACCE	Etablissement Autonome de Contrôle et de Certification des Exportations
EAGGF	European Agricultural Guidance and Guarantee Fund
EBDA	Egyptian Biodynamic Association
EOA	Egyptian Centre of Organic Agriculture
ECOAS	Egyptian Centre of Organic Agriculture Society

EEC Economic European Union
EKOTAR Ekologik Tarim
ESHE-CM Ecole Supérieure d'Horticulture et d'Elevage de
Chott
Mariem
ETK Ekologik Tarim Komitesi
ETKO Ekologik Tarim Kontrol Organzasyonu
ETO Ekologik Tarim Organzasyonu
ETO Ekolojik Tarım Organizasyonu Derneği
EU European Union
FAO Food and Agriculture Organization
FNAB Fédération Nationale de l'Agriculture Biologique des
Régions de France
FNAB Fédération Nationale des Producteurs Biologiques
FRAB Fédération Régional des Agrobiologistes de Bretagne
GDP Gross Domestic Product
GfRS Gesellschaft für Ressourcenschutz mbH
GRAB Groupe de Recherche en Agriculture Biologique
GRAB-IT Gruppo di Ricerca in Agricoltura Biologica-Italia
GTZ Deutsche Gesellschaft für Technische Zusammenarbeit
GmbH
IAMB Istituto Agronomico Mediterraneo di Bari
IAV Institut Agricole et Vétérinaire
IBOAA Israeli Bio Organic Agriculture Association
IFOAM International Federation of Organic Agriculture
IMC Istituto Mediterraneo di Certificazione
INAC International Nutrition and Agriculture Certification
INAT Institut National Agronomique de Tunisie
INNORPI Institut National de la Normalisation et de la
Propriété
Industrielle
INRAA Institut National des Recherches Agronomiques
d'Alger
INRAT Institut National de la Recherche Agronomique de
Tunisie
INRAT-CRP Institut National de la Recherche Agronomique de
Tunisie - Centre de Recherche Phoenicicoles
IOAS International Organic Agriculture Services
IRESA Institution de Recherche et d'Enseignement
Supérieur
Agricole
ISMEA Istituto per gli Studi, Ricerche e Informazione
sul
Mercato Agricolo
ISO International Standards Organization
ITAB Institut Technique de l'Agriculture Biologique
ITC International Trade Centre
LARI Lebanese Agriculture Research Institute

LU Lebanese University
MAICH Mediterranean Agronomic Institute of Chania
MAP Medicinal and Aromatic Plants
MARA Ministry of Agriculture and Rural Affairs
MECTAT Middle East Centre of Transfer of Appropriate
Technology
MOAM Maltese organic agriculture Movement
MOAN Mediterranean Organic Agriculture Network
NGO Non Governmental Organisation
No. Number
OA Organic Agriculture
OAA Organic Agriculture Association
OECD Organization for Economic Cooperation and
Development
OM Organic Matter
ONAB Observatoire National de l'Agriculture Biologique
SOGE Association of Ecological Agriculture of Greece
SÖL Stiftung Oekologie und Lanbau
UGEoba Union of Growers and Exporters of Organic and
Bio-
dynamic Agriculture
UK United Kingdom
UN United Nations
UNCTAD United Nations Conference on Trade and
Development
UNDP United Nations Development Programme
USA United States of America
USJ Saint Joseph University
WHO World Health Organization
WTO World Trade Organization

Members of the MOAN

(Mediterranean Organic Agriculture Network)

1. Coordination Committee

Maurizio Raeli

IAM-B

Via Ceglie, 9

70010 Valenzano (BA)

Italy

Tel. +39.080.4606282

Fax. +39.080.4606206

raeli@iamb.it

Fabrizio De Castro

IAM-B

Via Ceglie, 9

70010 Valenzano (BA)

Italy

Tel. +39.080.4606311

Fax. +39.080.4606206

decastro@iamb.it

Lina Al-Bitar

IAM-B

Via Ceglie, 9

70010 Valenzano (BA)

Italy

Tel. +39.080.4606254

Fax. +39.080.4606206

albitar@iamb.it Damiano Petruzzella

IAM-B

Via Ceglie, 9

70010 Valenzano (BA)

Italy

Tel. +39.080.4606311

Fax. +39.080.4606268

petruzzella@iamb.it

Vincenzo Fersino

IAM-B

Via Ceglie, 9

70010 Valenzano (BA)

Italy

Tel. +39.080.4606279

Fax. +39.080.4606268

fersino@iamb.it

2. Research Group

Velesin Peçuli

University of Tirana

Albania

Tel. +355.42.28296

+355.382037153

Fax. +355.42.27804

Abdelkader Aissat

University of Blida

Algeria

Tel. +213.25.433938

Fax. +213.25.431164

aeikaissat@yahoo.fr

Ahmed El-Araby

Ain Shams University

Cairo - Egypt

Tel. +202.4440458

+202.4048167

+202.2873359

Fax. +202.4446651

+202.4048167

elaraby@asunet.shams.eun.eg

Gabriel Guet

Agro Sud Consultants

La Bergerie - les Iles

84840 Lapalud

France

Tel. +33.4.90403082

Fax. +33.4.90402429

Jean Estephan

Ministry of Agriculture

Beirut - Lebanon

Tel. +961.5.455630/5

+961.3.814109

Fax. +961.5.455620

jeanstephan@hotmail.com

Randa Khoury

Institut de Recherche Agronomique Libanais

Fanar - Liban

Tel. +961.1.682 471/4/5/6/7

Fax. +961.1.682 472

randa_khoury00@hotmail.com

Peter Agius

Ministry of Agriculture

Malta

Tel. +356.695073

Fax. +356.243895

peter.agius@magnet.mt

Lahcen Kenny

Institut Agricole et Vétérinaire

Hassan II

Agadir - Morocco

Tel. +212.48.241006;

+212.61.387840

Fax. +212.48.242243

kenny@mtds.com

Mohamed Ben Kheder

Centre technique de l'agriculture biologique

Sousse - Tunisia

Tel. +216.3.346278/9

Fax. +216.3.346277

benkheder.mohamed@iresa.agrinet.tn

Uygun Aksoy

Ege University

Izmir - Turkey

Tel. +90.232.3881865

Fax. +90.232.3881864

aksoy@ziraat.ege.edu.tr