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ORGANIC FARMING - WHAT IS GOING ON IN EUROPE?

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Abstract

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Nowadays, crop organic management is implemented in all EU member- states to a smaller or larger extent.

The aim of the present work is the analysis of the progress made in organic farming adoption rates in the EU member-states, in the years 1998 – 2008, in order to assess implementation rates and reach safe conclusions with respect to the expansion and integration of organic practices in each one of the EU member-states. In order to form a clearer view of the integration of organic practices for each one of the 27 European countries, Geographical Information System (G.I.S.) was used. Additionally, descriptive statistics was used to summarize all data.

Results of this study demonstrate a rising trend in organic farming growth rates, organically managed plottage having increased by 2.7 times in the years 1998 – 2008. Moreover, findings show that states which have below EU average organic farming adoption rates show higher growth rates for organically managed plottage and therefore a tendency towards counterbalance and convergence with the EU member-states average.

Key words: organic farming, adoption rate, Europe, GIS

Introduction

In recent times organic farming keeps attracting the interest of producers and consumers alike, aiming at the creation of a sustainable production system, with a capacity to sustain and protect nature and the landscape, as well as to minimize environmental damage induced by existing agricultural practices (Pacini et al., 2003; Lund and Algers, 2003), which by their high chemical approach disrupted and harmed ecosystems, thereby degrading food-supplying natural resources.

The above implications in correlation with criticism raised against the course of the existing form of agriculture (Sundrum, 2001), as well as a constantly growing consumer concern over food safety and environmental protection issues contributed to a rise in organic production methods in the last decade (Yussefi and Willer, 2003; von Borell and Sørensen, 2004).

From time to time different terms have been used to describe the concept of biological agriculture (Rigby and Caceres, 2001; Pacini et al., 2003). EU defines biological agriculture as an ecologic production management system, which promotes and supports biodiversity, biological life cycles and biological soil activity. It is based on minimal use of external inputs and on management prac-

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tices that sustain and support ecologic welfare. Essential guidelines on organic production are based on the use of materials and implementation of practices, which support the ecobalance of natural habitats and integrate the agricultural system constituents into the whole of the ecosystem. Pacini et al. (2003) define organic farming as a sustainable production system, which has the capacity to sustain and support nature and the landscape, as well as minimize environmental damage induced by existing agricultural practices.

The aim of the present study is to analyze the progress made in organic farming adoption rates in the EU member-states, in the years 1998 – 2008, in order to establish organic practice assimilation rates, with the final objective to reach certain conclusions about the EU member-states standing in the course of time.

The Development of Organic Farming in Europe

Organic farming, as an applied form of the more global ecologic trend first appeared in the early part of the 20th, mainly in northern European countries, as the aftermath of three principal movements created by Rudolf Steiner, Sir Howard, Rusch and Muller respectively.

The above movements raised issues of questioning the already existing agricultural practices and their effect on the economy, on the environment and on human health matters. From then on biological agriculture took its course and developed in three distinct stages and periods.

The first period extends from the late ‘50s until the end of the ‘60s. During this whole decade, the main objective of agriculture was to meet the needs for food as well as to increase self-efficiency rates in the European Community. However, this stepping-up process had a series of negative effects, not only for the environment but also for man. In the agricultural sector the first bioproducers, few of which are farmers, turn to integrating technology into agriculture, such as that utilized by developing countries, using low energy and regional resources.

The second period extends from the mid-‘70s to the end of the ‘80s. Organic farming growth is enhanced by newly introduced incentives, the principal one being that it is regarded as the solution to all conventional farming implications. The 1974 oil crisis (resulting in conventional farming rise in costs, due to its dependency on industry), the formation of IRAAB (Institute on Research and Application in BioAgriculture) in 1979, as well as that of IFOAM, in combination with a development in research on organic farming by several academic institutions contributed to its secure establishment and growth. Obviously, this second stage is also marked by the pressing need of organic producers to survive in the market, as well as by a boost of organic farming through research.

Finally, the third stage runs from the ‘80s up to this day. Growing concern for the negative environmental impact of modern agricultural practices, led to a number of initiatives by governmental as well as non-governmental organizations in order to promote the adoption and expansion of sustainable agricultural technologies (De Souza et al., 1999), such as organic farming. In the face of this increased pressure, Common Agricultural Policy reviews its objectives and turns to sustainable agriculture, acknowledging the part which organic farming could play in achieving the reviewed objectives. Furthermore, organic farming returns into the spotlight thanks to the growing demand by consumers for safe and environmentally friendly goods. Several European countries acknowledged organic farming as an alternative production method and passed national laws for its incorporation in the system (France, Austria, and Denmark) (European Communities, 2000). In view of such progress and in order to reinforce consumer trust in organic farming there had to be

laid down a strict legislative context, which would define and determine organic farming. In June 24, 1991, with the regulation 2092/91 of the European Council, on organic production methods of agricultural products (Oxouzi, 2008), organic farming is officially placed within the EU. Nowadays, organic agricultural management is implemented in more than 140 countries worldwide, the highest adoption rates occurring in the EU member-states.

Research Methodology

In order to form a clearer view of the integration of organic practices for each and every one of the 27 European countries, Geographical Information System (G.I.S.) was used.

GIS (Geographical Information System) is a general-purpose computer-based technology for handling geographical data in digital form. It is designed to capture, store, manipulate, analyze and display diverse sets of spatial or geo-referenced data. These data contain both geometry data (coordinates and topological information) and attribute data (i.e. information describing the properties- attributes of geometrical objects such as points, lines and areas).

In this paper GIS is used for handling both spatial and attribute data. Spatial data consist of the boundaries of 27 European countries'. In order to georeference, the above spatial data with their attributes the names of the tabular forms of the ECHP report (EUROSTAT by European Commission, Nuts 2) is used. The software used in order to process all the data was MapInfo Professional. All results were assigned with their corresponding Nuts 2 codes, inserted into the GIS and related to the corresponding Nuts 2 codes of the MapInfo's tabular form dataset. Inside the GIS the statistic results were processed and presented in a map form called thematic maps.

In this paper, the main thematic maps (background information) are created and shaded by the use of the ranges of the values of organic farming adoption rate. This type of thematic mapping groups all records (attributes concerning our spatial information) into ranges and assigns each record's object the color for its corresponding range. The custom method is used and divides records across ranges of desirable size. Adoption rate classes used for plotting the integration of organic practices over time, for each and every one of the 27 European countries are as follows: 0-1%: very light green, 1-3%: light green, 3-5%: green, 5-7%: dark green and >7%: very dark green. Records-attribute values are based on a secondary database by Willer and Yussefi in cooperation with FIBL (Research Institute of Organic Agriculture), SOEL (Foundation Ecology and Agriculture) and IFOAM (International Federation of Organic Agriculture Movements) for all 27 EU member=states.

The Adoption of Organic Farming in the E.U.

During 1986-1999, organic farming annual increase reached 25.0%, the highest growth rates noted mainly in the Scandinavian and Mediterranean countries (Lampkin et al., 2001). Nowadays, organic farming does not show the same growth rates compared to previous years, whereas in some cases a certain decrease is observed (Oxouzi, 2008).

In comparison to the 1998-2008, organic farming development rates in the European Union rising growth rates are found, with total organically managed plottage increased in this period by 4.7 millions of hectares (167.3%).

More specifically, the course of organic faming in the EU during 1998-2008, exhibits high expansion rates for organically cultivated plottage, as well as for newly incorporated land. Total organically cultivated plottage showed annual growth rates ranging from 3.8% in 2003-2004, to 17.5% in 2002-2003 (Figure 1). It should be pointed out that despite the originally high expansion rates

for organically cultivated plottage (1998 – 2001), in recent years (2006 – 2008) expansion still occurs though its rates drop noticeably (Figure 1). It should also be noted that during the 11-year period all states have expanded organically managed land, from 3039.4% (Poland) to 9.8% (Finland) with the exception of Denmark where there has been a 6.4% decrease (Table 1).

In more detail, in the first 7-year period (1998 – 2004) there has been intense and effective expan-

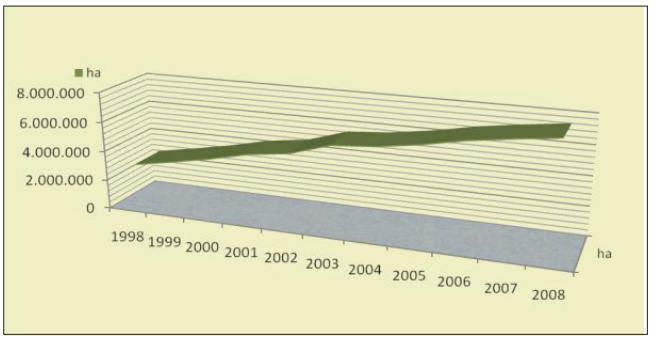


Fig. 1. Organic farming in the EU

Table 1
Organic plottage and farm development in the EU in 1998 – 2008

Country	1998 [1]		2004 [2]		2008 [3]	
	Organic area, ha	Organic farms	Organic area, ha	Organic farms	Organic area, ha	Organic farms
Austria	287 900	20 207	344 916	19 826	382 949	20 102
Belgium	11 350	550	23 728	712	35 719	901
Bulgaria	-	-	12 284	351	16 663	254
France	234 800	6 500	534 037	11 059	583 799	13 298
Germany	416 318	9 209	767 891	16 603	907 786	19 813
Denmark	160 369	3 029	154 921	3 166	150 104	2 753
Greece	15 848	4 231	249 488	8 269	317 824	24 057
Estonia	5 291	90	46 016	810	87 346	1 259
UK	291 538	1 356	690 270	4 010	737 630	5 383
Ireland	28 704	887	30 670	897	44 751	1 220
Spain	269 465	7 392	733 182	16 013	1 129 844	21 291
Italy	788 070	43 698	954 361	36 639	1 002 414	44 556
Cyprus	30	15	1 018	225	2 322	305
Latvia	19 000	-	43 902	1 043	161 625	4 203
Lithuania	4 006	-	64 545	1 811	122 200	2 797
Luxembourg	1 002	29	3 158	66	3 535	85
Malta	-	-	13	20	12	30
Holland	22 997	1 216	48 152	1 469	50 434	1 402
Hungary	30 000	1 200	128 690	1 583	122 816	1 614
Poland	10 000	500	82 730	3 760	313 944	14 888
Portugal	29 533	560	206 524	1 302	229 717	1 949
Romania	-	-	75 000	1 200	140 132	2 775
Slovakia	17 000	-	93 943	218	140 755	350
Slovenia	3 000	312	23 032	1 568	29 838	2 067
Sweden	127 000	2 860	206 579	3 138	336 439	3 686
Czech Rep.	100 000	445	260 120	836	341 632	1 946
Finland	137 000	5 200	162 024	4 887	150 374	3 991
TOTAL E.U.	2 821 894	106 924	5 853 910	141 481	7 542 603	196 975

[1]E.U. – 15, [2]E.U. – 25, [3]E.U. – 27

sion of organic farming, total organically managed plottage being increased by 2.1 times, i.e. from almost 2.8 millions of hectares to 5.8 millions of hectares.

States with the highest expansion rates for organically managed land in 1998-2004 are Cyprus (77.4 times), Lithuania (16.1 times), Greece (15.7 times), Estonia (8.7 times), Poland (8.3 times), Slovenia (7.7 times) and Portugal (7.0 times). It should also be noted that the above-mentioned countries (mainly Estonia, Cyprus, Poland and Slovenia) also show the highest expansion rates for organic farming in the same period. It is also remarkable that although the above countries are new member-states of the EU (admittance in 2004, except Greece and Portugal) they show great concern over environmental issues and a remarkable drive for adopting organic production methods. The only exception to the ascending course of organic farming implementation and therefore growth is Denmark, which decreased organically managed plottage by 3.4%.

It is worth noting that although Austria, Finland and Italy increased plottage for this alternative production system, during 1998 – 2004, they decreased the actual number of organic farms by 1.9%, 6.0% and 16.2%, respectively.

Organic farming development data in the EU during the following 5-year period (2004 – 2008) shows an ongoing positive trend in development, with total organically managed plottage on the increase in this period by 4.7 millions of hectares (167.3%) when compared to total plottage in 1998.

Countries showing the highest organically managed plottage increase during 2004 – 2008 are Poland (279.5%), Latvia (268.1%), Cyprus (128.1%), Estonia (89.8%), Lithuania (89.3%) and Romania (86.8%). It is worth noting that those countries occupy 11.0% of the EU organically managed land. The exception to this positive trend in the implementation and consequent development of organic farming comes from Finland, Denmark and Malta, which have decreased organically managed land in 2004 – 2008 from 3.1% to 7.7% (Table 1).

As for the progress made in the number of organically managed farms in the EU during 2004 – 2008 there has been, according to data in Table 1, a 39.2% increase. More specifically, countries showing the highest growth rates in the number of organically cultivated farms are Latvia (303.0%), Poland (296.0%), Greece (190.9%), the Czech Republic (132.8%) and Romania (131.3%). On the contrary, countries with the highest decrease in the number of organically managed farms, in the same period, are Bulgaria (27.6%), Finland (18.3%), Denmark (13.0%) and Holland (4.6%).

Holland, in particular, despite increasing alternatively cultivated plottage, in 2004 – 2008, cut down on the number of organic farms and therefore fell below the community average in 2008. On the other hand, although Denmark and Finland reduced organic plottage as well as farms simultaneously, they managed to keep a large number of hectares and farms in biological agriculture (Table 1).

An additional variable, which will be analyzed further on in relation to growth- expansion of organic farming, is the adoption rate. The adoption rate not only shows organically managed plottage but also in proportion with total national plottage. In other words, it provides a better picture of the "real" development, expansion and integration of organic practices in each EU member-state.

As far as organic farming adoption rates are concerned, in 1998, among EU countries, Table 2 data reveals that 75.0% of them are below EU average, which is 1.91%. Actually, half of all 24 states do not exceed 0.8% (Figure 2). In fact, Ireland, Greece, Portugal and France and among non member-states Cyprus, Lithuania, Poland, Estonia and Slovenia, which at that time were off European Union, show the lowest adoption rates for organic farming within the EU during that period, (Map 1, class: 0-1% very light green). In contrast, in only 7 states organic farming adoption rates were above

EU average in 1998, the highest percentages representing Austria (8.4%), Finland (6.3%), Denmark (6.0%) and Italy (5.3%) (Map 1).

There is a dramatic improvement in the organic farming adoption rate picture in 2004: by that time, 48.0% of all states have already turned more than 3.7% of their total plottage towards organic farming. More specifically, countries with the highest percentages of organically managed land in proportion to their total plottage are Austria (13.5%), Finland (7.3%) and Sweden (6.8%) (Map 2, Table 2). Their adoption rates are more than double the EU average (3.7%). On the other hand, the majority of member-states (52.0%), have not yet adopted this alternative production system to a satisfactory degree since they have not managed to incorporate even a mere 3.0% of their land into organic farming. Spain is at 2.9%, the median for 2004 (Figure 2), while countries with the lowest numbers of organically managed hectares in proportion to their cultivated land include Malta (0.1%), Bulgaria (0.2%), Poland (0.5%), Romania (0.5%) and Ireland (Map 2, class: 0-1% very light green, Table 2).

Table 2
Adoption rate development of organic farming in the EU during 1998 – 2008

Country	Adoption rate of OFS, %		
	1998 [1]	2004 [2]	2008 [3]
Austria	8.4	13.5	15.9
Belgium	0.9	1.7	2.6
Bulgaria	-	0.2	0.5
France	0.8	1.8	2.1
Germany	2.4	4.5	5.4
Denmark	6.0	5.8	5.6
Greece	0.5	6.2	7.9
Estonia	0.3	5.2	9.6
United Kingdom	1.8	4.4	4.6
Ireland	0.5	0.7	1.1
Spain	1.1	2.9	4.5
Italy	5.3	6.2	7.9
Cyprus	0.0	0.7	1.6
Latvia	0.8	1.8	9.1
Lithuania	0.1	1.9	4.6
Luxemburg	0.8	2.5	2.7
Malta	-	0.1	0.1
Holland	1.2	2.5	2.6
Hungary	0.5	2.2	2.1
Poland	0.1	0.5	2.0
Portugal	0.7	5.4	6.6
Romania	-	0.5	1.0
Slovakia	0.8	4.2	7.3
Slovenia	0.4	4.6	6.1
Sweden	3.7	6.8	10.8
Czech Republic	2.5	6.1	8.0
Finland	6.3	7.3	6.6
TOTAL E.U.	1.9	3.7	5.1

[1]E.U. – 15, [2]E.U. – 25, [3]E.U. – 27

In 2008, there is a noticeable increase in the range of values among the 25 European countries (Figure 2). According to Table 2 data, the EU adoption rate average is 5.1%, whereas the median is 4.6% (Figure 2) and corresponds to the Lithuanian rate. The highest implementation rates of this alternative production system compared to the total agricultural land per country are noted in Austria (15.9%), Sweden (10.8%), Estonia (9.6%) and Latvia (9.1%) (Table 2, Map 3, class >7% very dark green). Remarkably, Estonia and Latvia, even though they became EU member-states as late as in 2004, managed in a relatively short time to suc-

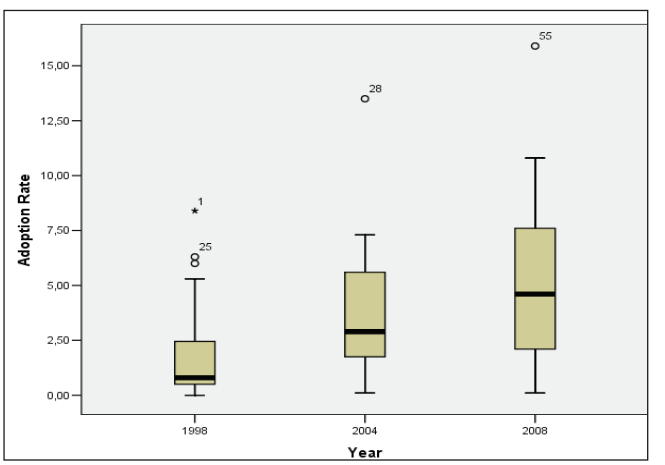
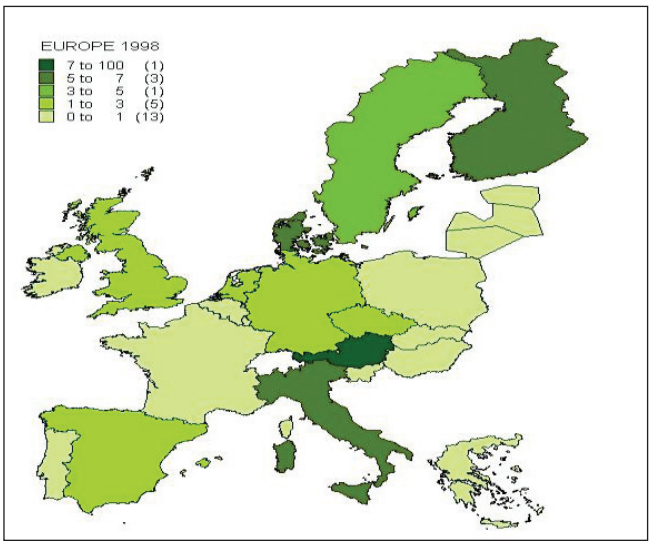
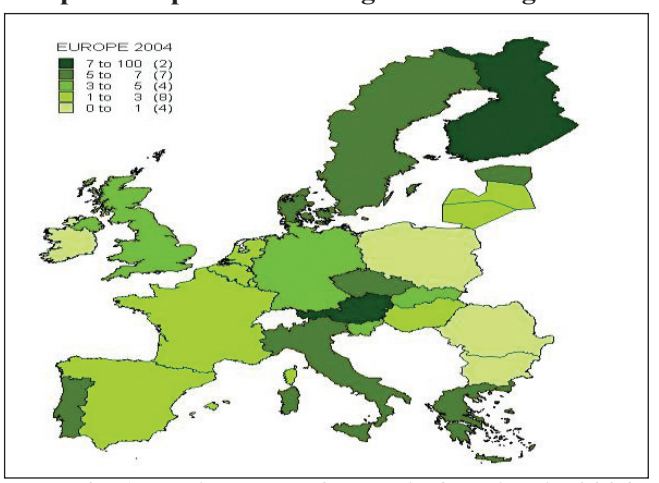


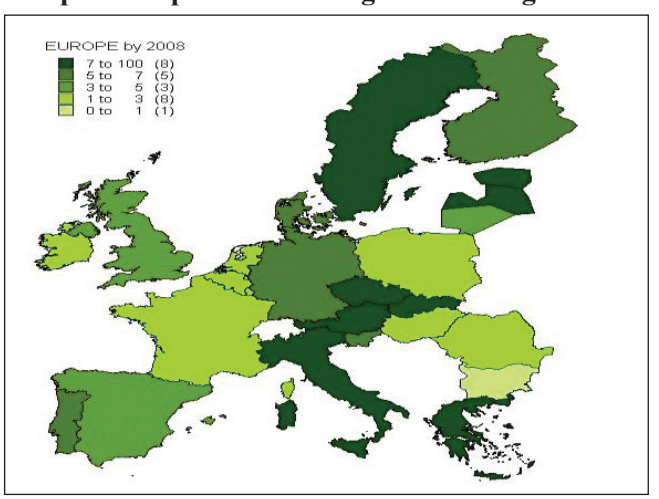
Fig. 2. Adoption rate of organic farming box plot



Map 1. Adoption rate of organic farming in 1998



Map 2. Adoption rate of organic farming in 2004



Map 3. Adoption rate of organic farming in 2008

cessfully implement European directives (environmental measures) and convert a large proportion of conventionally cultivated land into organic.

On the other hand, 11 member-states are below the European average with respect to organic farming adoption rates, the lowest ones being observed in Malta (0.1%), Bulgaria (0.5%), Romania (1.0%), Ireland (1.1%) and Cyprus (1.6%).

Studying the way adoption rates develop among EU member states in 1998, 2004 and 2008 and based on the thematic maps, it is evident that countries, which have mostly raised organic farming adoption rates in 1998 – 2008, are Greece, Estonia, Latvia and Slovakia (Maps 1 and 3). Those countries have managed in an 11-year period to increase their organic farming adoption rates by 9 (Slovakia) to 32 (Estonia) times and move from the lowest adoption rate category in 1998 (class: 0-1% light green) to the highest one in 2008 (class >7% very dark green). A significant increase in organic practice adoption rates, in the same period (1998-2008), was also observed for Slovenia and Portugal, which, in 2008, managed to incorporate a further 5.7% and 5.9% of their total plottage into organic farming in comparison to 1998. In contrast, the lowest percentile increase of organically-managed land in proportion to total hectares is shown by Finland and Ireland which, during a 11-year period, increased adoption rates by a mere 0.3% and 0.6% respectively.

Denmark, on the other hand, constitutes the only exception to this generally rising trend in the development of organic farming, during that period, since it decreased its percentage of organically managed land from 6.0% to 5.6%. Nevertheless, it should be pointed out that the highest growth rates for organic farming occurred in the first 7-year period (1998 – 2004), when the EU average adoption rate for organic practices increased by a total of 62.0%. During that time, the adoption of organic practices grew in all EU states, except for Denmark, which reduced its percentage of organic

plottage by 0.2%. States with the greatest adoption rates for organic practices are Greece, Austria, Estonia and Slovenia (Map 2, Maps 1 and 2).

In the second 5-year period (2004 – 2008) despite the ongoing expansion of biological agriculture and the conversion of more conventional hectares into organic ones, the actual adoption rates rising trend was not maintained. Nevertheless, it should be pointed out that during that 5-year period 25 EU member-states converted more than 1% of their conventional plottage into organic, (with the exception of Bulgaria and Malta), a remarkable fact considering that in 1998 as many as 14 states showed adoption rates less than 1% (Maps 1 and 3).

It is worth noting that states such as Germany, Italy, the United Kingdom and Austria, traditional leaders in adopting new technologies-innovations and despite their increased implementation of the system, did not maintain the same growth rates as in the previous 7-year period (1998 – 2004). However, it is worth mentioning that in those states adoption rates of this sustainable production system in 2004 ranged from 4.4% to 13.5%, i.e. well above EU average at 3.4% (Map 2).

All the above findings indicate that countries whose organic farming adoption rates were below EU average in 1998 and in 2004, showed higher growth rates of organically managed plottage and therefore a tendency for counterbalance and convergence with the EU member-states average.

Conclusions

The aim of the present study was to assess the progress made by EU member-states concerning the adoption of organic practices in 1998 – 2008. More specifically, the study focused not only on actual organic plottage in each and every one of the EU member-states, but principally on the adoption rates, i.e. organic plottage share in total cultivated land per country, with the aim to record and analyze "real" growth, expansion and integration of organic practices in each EU member-state. For a clear view of the extent of organic practice integration in each and every one of the 27 European countries, Geographical Information System (G.I.S.) was used. In addition, descriptive statistics was used to summarize all data.

Study results revealed a positive trend in organic farming growth rates, organically managed plottage having increased by 2.7 times in the years 1998 – 2008. It should also be noted that in 11-year period all countries have increased organically managed plottage, with the exception of Denmark, which has reduced it by 6.4%. Presently, Spain, Italy and Germany are the ones with the highest organically managed plottage, occupying as much as 40.3% of the EU total organic land.

As far as organic practice adoption rate development is concerned, it was revealed that Greece, Estonia, Latvia and Slovakia are the states with the highest increase in organic farming adoption rates in 1998 – 2008 and managed to climb within an 11-year period from the lowest to the highest national organic farming adoption rate category. During the same period, (1998-2008) Slovenia and Portugal also showed a considerable increase in organic farming adoption rates. Nowadays, Austria, Sweden and Latvia are the ones with the highest proportion of organically managed plottage, having converted more than 9.0% of their conventionally cultivated land into organic.

In conclusion, states whose organic farming adoption rates are below the EU average show higher rates of increase in organically managed plottage and therefore a tendency for counterbalance and convergence with the EU member-states average.

Presently, organic farming is implemented in all member-states to a larger or smaller extent. The European Union acknowledges the significance of organic farming as a realistic proposal in the context of a new agricultural production model and in a constantly changing and competitive environment.

It also realizes consumer demand for safe and environmentally friendly products. It has therefore reviewed its aims through Common Agricultural Policy (CAP), thereby providing higher incentives for organically managed production.

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