

CIHEAM Analytic note

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The challenge posed by the cereals sector in the Mediterranean

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Cereal farming is regarded as the mainstay of great civilisations. It was one of the first agricultural activities, providing a reliable source of food and a focus for the organisation of human affairs. The rise of different civilisations thus went hand in hand with the production of cereals: wheat in Europe and the Middle East, rice in the Far East, maize among the indigenous American peoples, and millet among the peoples of sub-Saharan Africa.

Cereals have long held an important place in the Mediterranean Region but the sector has been facing new challenges for several decades now. First and foremost is the need to boost production to meet growing requirements. The past quarter of a century has seen a rapid rise in the population accompanied by a general increase in the demand for cereals, which local production has been unable to satisfy.

At CIHEAM's fifth ministerial meeting in Paris in December 2004, the final declaration² highlighted the growing importance of cereals in Mediterranean agricultural trade³. Mediterranean cereals were therefore the main focus of CIHEAM's eighth annual report on the regional economic situation, which analysed the sector in terms of production, consumption and trade.

This note sets out to give a summary presentation of the outlook for cereal supplies in the Mediterranean countries, based on the studies contained in the aforementioned report⁴. It will seek to determine the precise strategic significance of cereals for the Mediterranean by examining consumption, demand, production and trade successively, while considering likely prospects for the coming years.

¹ This analytical note is taken from the 2006 report "*Panorama stratégique et prospectif de la situation agricole et agro-alimentaire en Méditerranée*", produced by CIHEAM's General Secretariat (under the direction of Bertrand Hervieu and the responsibility of Sébastien Abis) for the French Ministry of Agriculture and Fisheries as part of the annual work programme of the Council for European and International Food and Agriculture Forecasting (COPEIAA). Funding for the research was thus provided by the French Ministry of Agriculture and Fisheries (Direction des politiques économique et internationale - reference MAP.06.G6.02.01).

² See paragraph 5 in "*The Mediterranean region: a special area for the production and trading of agricultural and agri-food products*", Final Declaration of the 5th Meeting of the CIHEAM Member Countries' Ministers of Agriculture, Paris, 15 December 2004.

³ CIHEAM, *AgriMed 2006, Agriculture, pêche, alimentation et développement rural durable dans la région méditerranéenne* (under the direction of Bertrand Hervieu), Paris, April 2006.

⁴ See "*La Méditerranée et la question céréalière. Géostratégie, échanges et perspectives* », part II of the CIHEAM Annual Report, *AgriMed 2006*, op.cit, pp. 35 to 199. This work on the cereals issue was done by Mahmoud Allaya, Gabrielle Rucheton, Akka Ait El Mekki, Foued Chehat, Alicia Langreo, Isabel Benito, Erol Cakmak and Ozan Eruygur.

1. Cereal consumption and demand

Cereals are the basis of the normal diet in most Mediterranean countries. While the region is home to numerous cultural and culinary traditions, it is estimated that cereals account for 35-50% of the regional populations' dietary energy consumption. Consumption of cereal products is nevertheless a matter of consumer choice, reflecting a particular way of life and standard of living.

In countries where consumption is high and incomes are low, direct human consumption of cereals is about 250 kg per inhabitant per year. In these countries cereals represent the least expensive source of calories in the diet but the consumers' cereal requirements are far from being satisfied. Any rise in income prompts a significant increase in demand for cereals. However, in countries where incomes are higher, cereals are normally replaced with meat, fruit and vegetables, which are more expensive. As choice diversifies and consumption patterns change, demand for cereals falls and per capita consumption is lower: between 120 and 150 kg of cereals per year. Cereal consumption thus differs significantly from one Mediterranean country to another. It is nevertheless possible to identify three distinct categories of country:

- The first includes countries with average annual per capita consumption between 200 and 250 kg: Morocco, Algeria, Tunisia, Egypt and Turkey;
- The second covers those where average consumption varies between 130 and 160 kg: Greece, Portugal, Italy, Albania and Malta;
- The third includes those whose average annual per capita cereal consumption is below 100 kg: France and Spain.

In the light of trends observed over recent decades, it would seem that per capita cereal consumption is steadily falling in countries in the last two categories and rising in those in the first, ie in countries where incomes are low.

human consumption of cereals (in kg/inhabitant/year)				
	1961	1982	1992	2002
Spain	145	104	100	98
France	132	107	105	117
Italy	180	159	155	162
Greece	167	158	150	152
Portugal	127	116	126	132
Albania	195	221	197	165
Malta	160	148	145	190
Algeria	139	191	224	217
Egypt	180	220	242	235
Lebanon	145	137	133	126
Morocco	185	240	233	247
Tunisia	165	192	219	204
Turkey	200	223	232	219

Sources: Our calculations, based on CIHEAM-AgriMed 2006

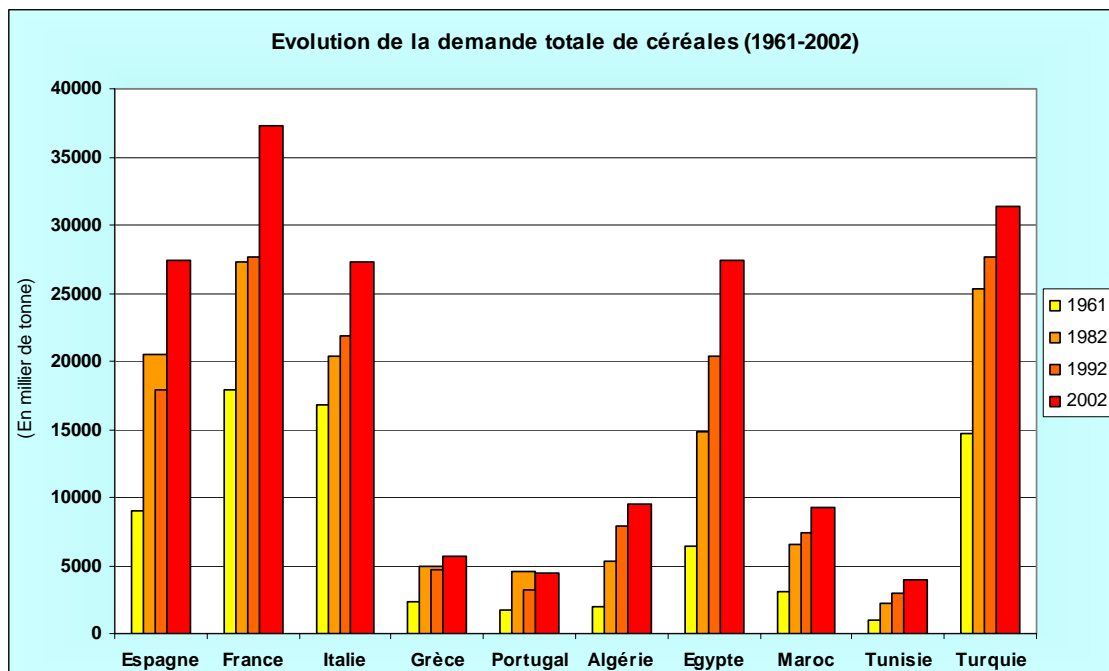
Lastly, in considering cereal consumption, it is important to take account of animal feed. In many Mediterranean countries cereals account for a large proportion of the feed used in stock breeding systems. To the North of the basin, the proportion exceeds 50%, as in Spain, France, Malta, Italy, Portugal and Greece. In countries to the South on the other hand the bulk of cereal supply is for human consumption. A rapid increase in the proportion used as animal feed can nevertheless be observed in Algeria, Egypt, Tunisia and Lebanon.

Total cereal demand (in thousands of tonnes) food and feed					
	1961	1982	1992	2002	variation index (1961-2002)
Spain	8,953	20,532	17,879	27,349	205.5%
France	17,897	27,306	27,627	37,283	108.3%
Italy	16,826	20,408	21,845	27,251	61.9%
Greece	2,364	4,967	4,666	5,696	140.9%
Portugal	1,759	4,625	3,268	4,463	153.7%
Albania	441	1,022	970	978	121.8%
Malta	84	113	171	198	135.7%
Algeria	1,949	5,356	7,858	9,493	387.1%
Egypt	6,412	14,821	20,353	27,348	326.5%
Lebanon	379	565	702	974	157.0%
Morocco	3,086	6,535	7,394	9,222	198.8%
Tunisia	1,003	2,229	2,976	4,003	299.1%
Turkey	14,670	25,338	27,615	31,324	113.5%
Total	75,823	133,817	143,324	185,582	144.7%

Sources: Our calculations, based on CIHEAM-AgriMed 2006

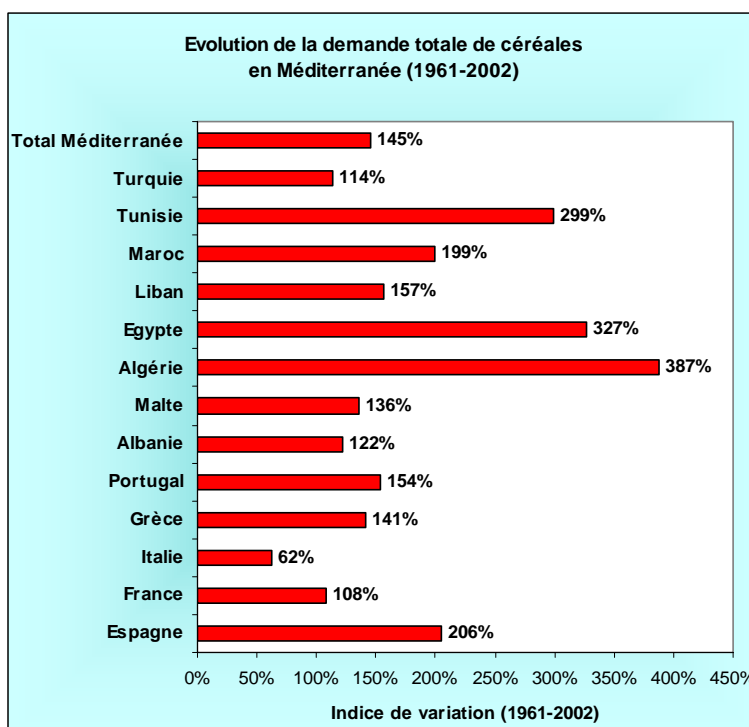
Total cereal demand in the Mediterranean has more than doubled since 1961, increasing from 75.8 to 185.6 million tonnes (Mt). More importantly it has risen roughly fivefold in Algeria, fourfold in Egypt and Tunisia and threefold in Spain and Morocco. In other countries, such as Italy, there has hardly been any increase in demand. At the present time it would seem that demand for cereals is particularly high in five countries: France (37.3 Mt), Turkey (31.3 Mt), Egypt (27.3 Mt), Spain (27.3 Mt) and Italy (27.2 Mt). These countries now account for nearly 81% of total cereal demand in the Mediterranean. In 1961, however their share was 90%.

Total cereal demand from 1961 to 2002



Sources: Our calculations, based on CIHEAM-AgriMed 2006

Total cereal demand in the Mediterranean from 1961 to 2002



Sources: Our calculations, based on CIHEAM-AgriMed 2006

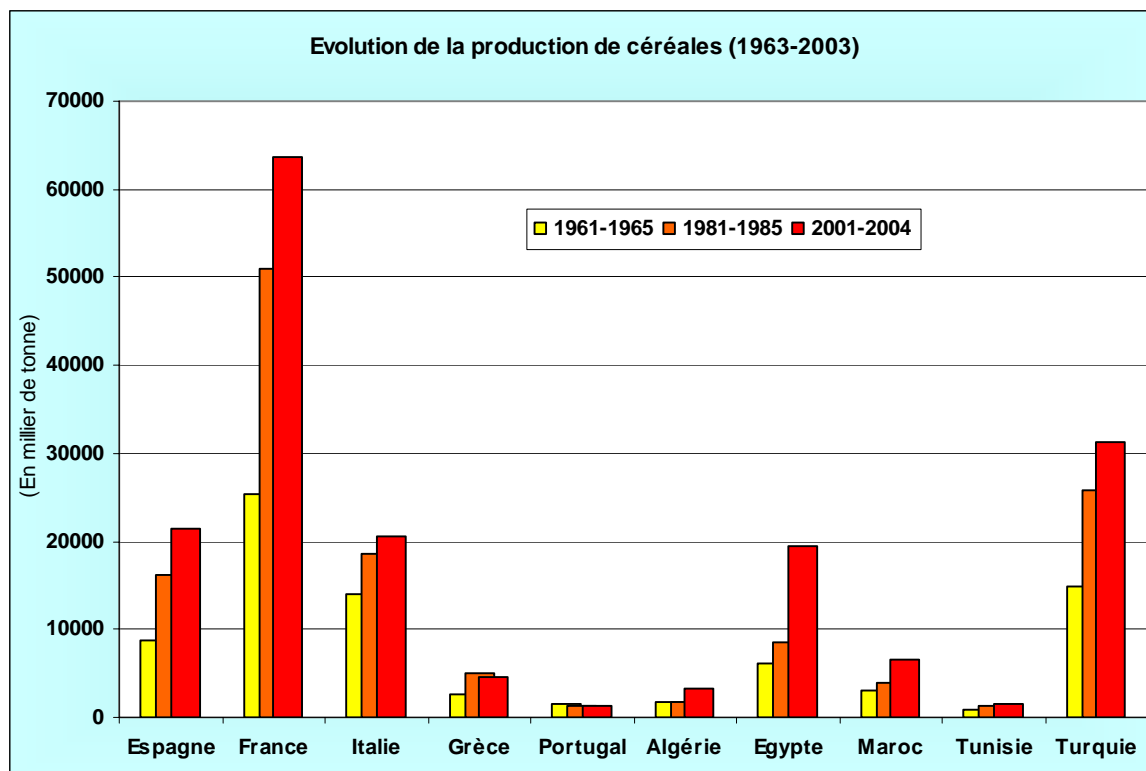
2. Cereal production in the Mediterranean

Taking up half of all cultivated land, cereals are by far the most important produce of the Mediterranean Basin. The major cereal-growing areas are in Turkey (14 million hectares), France (9 million hectares), Spain (6.7 million hectares) and Morocco (5 million hectares).

Over the period 2001-2004, around 175 Mt of cereals were produced by Mediterranean countries. This represents nearly 8% of world production. For purposes of comparison, 80 Mt of cereals were produced in the period 1961-1965 and 135 Mt in 1981-1985. The Mediterranean zone has therefore more than doubled its cereal production in the space of 40 years. However, five countries currently account for 89% of production. They are (in descending order) France (63.6 Mt), Turkey (31.3 Mt), Spain (21.4 Mt), Italy (20.5 Mt) and Egypt (19.4 Mt). These countries already produced 87% of all cereals in the Mediterranean in 1961-1965, although they also accounted for 81% of demand at that time.

Cereal production in the Mediterranean (in thousands of tonnes)				
	1961-1965	1981-1985	2001-2004	Annual average growth rate (1963-2003)
Spain	8,674.7	16,097.4	21,443.9	2.29
France	25,331.2	50,967.2	63,614.5	2.33
Italy	14,046	18,566.4	20,503.1	0.95
Greece	2,521.8	5,112.3	4,649.7	1.54
Portugal	1,609.1	1275	1,326.4	-0.48
Albania	317.3	995.2	513.9	1.21
Malta	5.1	10.1	11.8	2.10
Algeria	1,770.9	1,805.7	3,189.8	1.48
Egypt	6,076.2	8,495.3	19,465.3	2.95
Lebanon	91.5	29.5	145.3	1.16
Morocco	3,159.1	3,939.8	6,594.1	1.86
Tunisia	926.6	1,329.9	1,465.1	1.15
Turkey	14,831.1	25,876.7	31,289.5	1.88
Total	79,360.6	134,500.5	174,212.4	

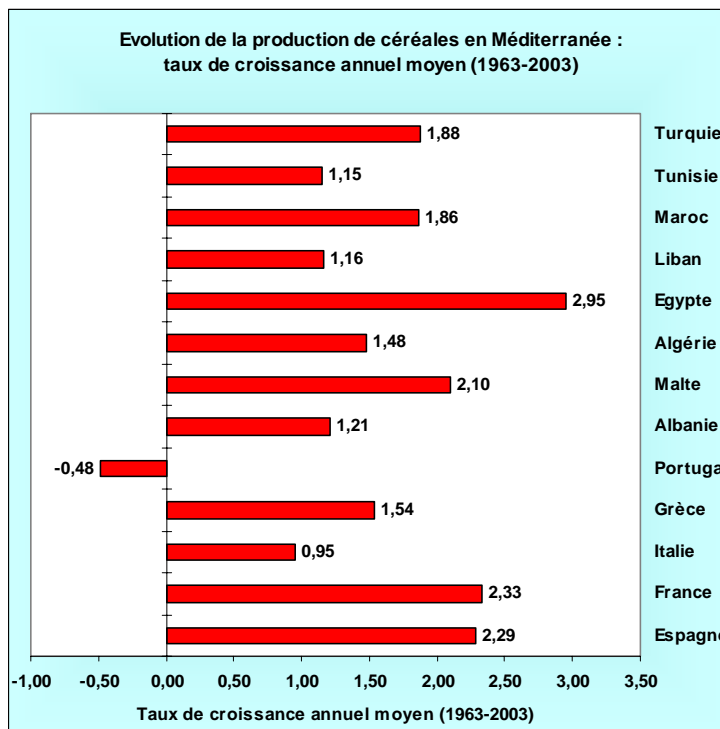
Sources: Our calculations, based on CIHEAM-AgriMed 2006



Sources: Our calculations, based on CIHEAM-AgriMed 2006

Growth in cereal production has been fairly strong over the past forty years, with average annual increases higher than 2% for Egypt (2.95%), France (2.33%) and Spain (2.29%). Only Portugal has seen a decline in growth over this period. It should also be emphasised that growth in production has been regular in some countries (France, Greece, Italy, Turkey and Egypt) but irregular in others (Morocco, Algeria and Tunisia). The irregular growth in the latter is due to two main factors: vagaries of climate and insufficient modernisation of production techniques.

**Cereal production in the Mediterranean:
average annual growth rate from 1963 to 2003**



Sources: Our calculations, based on CIHEAM-AgriMed 2006

Growth in cereal production is mainly due to improved yields, bearing in mind that the amount of cultivated land has diminished slightly in most Mediterranean countries (with the exception of Egypt, Morocco and Turkey). These higher yields are due to significant technical progress in genetics, technological improvements and effective policies.

But here again it is important to emphasise the diversity of situations in the Mediterranean. The highest yields of wheat are produced by France (7 tonnes per hectare) and Egypt (6.4 t/ha). Greece and Spain have the highest yields of maize (9.6 t/ha and 9.5 t/ha respectively), followed by Italy (9.1 t/ha) and France (8.4 t/ha).

Wheat is the main cereal produced in the Mediterranean: current output is 103 Mt and average annual production in the region is growing at a rate of around 1.4%. Maize is the second major Mediterranean cereal: current output is 47 Mt compared with 17 Mt in the period 1961-1965. This trend is largely due to the development of animal production. Growth in barley production has been fairly moderate and even negative in most countries in the zone, with the exception of Italy, Spain and Turkey.

It should also be noted that wheat yields have improved more than maize yields in most Mediterranean countries, most significantly in countries to the North of the Mediterranean. Yields increased sixfold in Greece, fourfold in Spain and nearly threefold in Italy and France between 1963 and 2003.

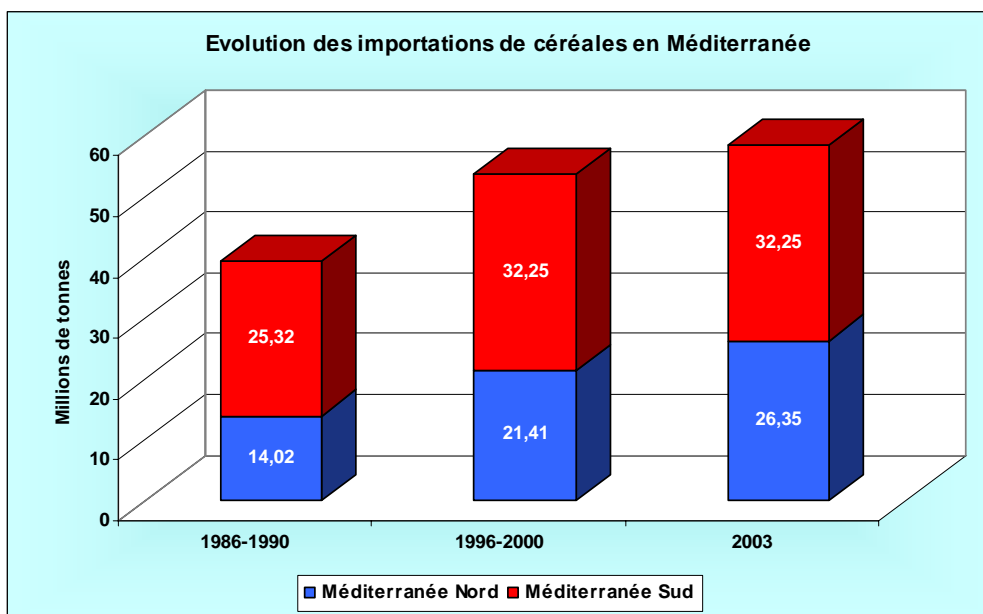
3. The Mediterranean cereals trade

The Mediterranean has a serious deficit in agricultural trade. Only France, Spain and Turkey had a surplus in agricultural trade in 2003 and the agricultural trade balance of the other countries in the region has deteriorated dramatically. It is important to appreciate this phenomenon if we are to understand developments in the Mediterranean cereals trade.

With the exception of France, Mediterranean countries have been net importers of cereals for many years. Domestic demand exceeds production and requirements are growing at a much faster rate than locally available supplies. The Mediterranean consequently imports more cereals than it produces.

If we analyse this phenomenon across the whole of the Mediterranean⁵, we find that in 2003 nearly 22% of world cereal imports were shipped to the Mediterranean zone (58.6 Mt): 12% to the South (32.3 Mt) and 10% to the North (26.3 Mt). The weight of the Mediterranean countries in world cereals trade has steadily increased: the region accounted for 18% of world cereal imports (39.3 Mt) between 1986 and 1990 and 21% (53.6% Mt) between 1996 and 2000.

Trend in Mediterranean cereal imports



Sources: Our calculations, based on CIHEAM-Medagri 2005

Cereal imports in the Mediterranean (millions of tonnes Mt)			
	1986-1990	1996-2000	2003
World	221.97	252.78	268.67
Mediterranean	39.34	53.66	58.6
Northern Mediterranean	14.02	21.41	26.35
Southern Mediterranean	25.32	32.25	32.25

Sources: Our calculations, based on CIHEAM-Medagri 2005

⁵ That is to say by examining data for the 18 states on the Mediterranean rim (Albania, Cyprus, Spain, France, Greece, Italy, Malta and Portugal in the North; Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Syria, Tunisia and Turkey in the South). These figures have been calculated on the basis of data given in the annual report of MAIM, *Medagri 2005*, under the direction of Mahmoud Allaya, Montpellier, March 2005, p. 239.

Cereal imports in the Mediterranean (share in total world imports)			
	1986-1990	1996-2000	2003
Mediterranean	17.7%	21.2%	21.8%
Northern Mediterranean	6.3%	8.4%	9.8%
Southern Mediterranean	11.4%	12.8%	12.0%

Sources: Our calculations, based on CIHEAM-Medagri 2005

These figures should be examined in relation to the demographic weight of the Mediterranean in the world: while the zone accounts for 22% of world cereal imports, it is home to just 7% of the world's population. The countries on the southern shore alone account for 12% of world cereal imports but represent only 4% of the world population.

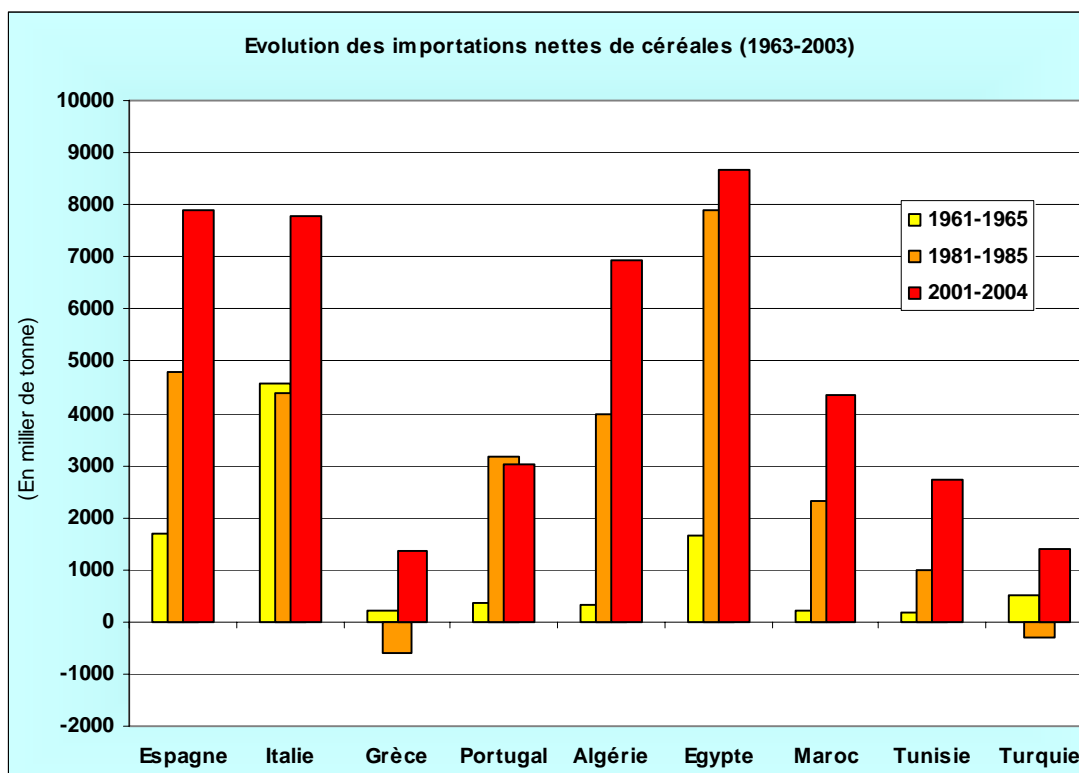
The European Union is the main supplier of cereals to the Mediterranean, followed by the United States, which has a particularly strong presence in the Egyptian and Turkish markets. Over the period 2000-2003, European and United States cereal exports to the Mediterranean markets are reckoned to have been worth \$7 billion, which represents around 23% of their total cereal exports worldwide.

Net cereal imports in the Mediterranean (in thousands of tonnes)				
	1961-1965	1981-1985	2001-2004	variation index (1963-2003)
Spain	1,678.9	4804.5	7,894.1	370.2%
France	-4,104.2	-21,810.9	-27433	-568.0%
Italy	4,568.4	4,389.4	7,778.4	70.3%
Greece	215.5	-589.7	1,361.3	531.7%
Portugal	377.4	3,185.5	3,007.6	696.9%
Albania	149.3	59.9	438.1	193.4%
Malta	84.6	119.5	151.5	79.1%
Algeria	310.1	3,992.4	6,946.7	2,140.1%
Egypt	1,669.3	7,880.6	8,668.3	419.3%
Lebanon	325.4	538.1	848.8	160.8%
Morocco	210.6	2321	4,366.4	1,973.3%
Tunisia	191.3	980.1	2,742.2	1,333.4%
Turkey	495.5	-298.6	1,405.7	183.7%
Total (without France)	10,276.3	27,382.7	45,609.1	343.8%

Sources: Our calculations based on CIHEAM-AgriMed 2006

If we analyse the figures on cereal imports for the 13 CIHEAM member states, we find that France is the only country that is not a net importer. In contrast we find that net cereal imports by the other countries have skyrocketed over the past forty years. They have quadrupled for the Mediterranean Region as a whole, rising from 10 Mt to 46 Mt. More importantly net cereal imports have risen by a factor of 21 in Algeria, 20 in Morocco, 13 in Tunisia, 7 in Portugal, 5 in Greece, and 4 in Egypt and Spain. At present the major net cereal importers are Egypt (8.7 Mt), Spain, (7.9 Mt), Italy (7.8 Mt), Algeria (6.9 Mt) and Morocco (4.4 Mt).

Net cereal imports between 1963 and 2003



Sources: Our calculations based on CIHEAM-AgriMed 2006

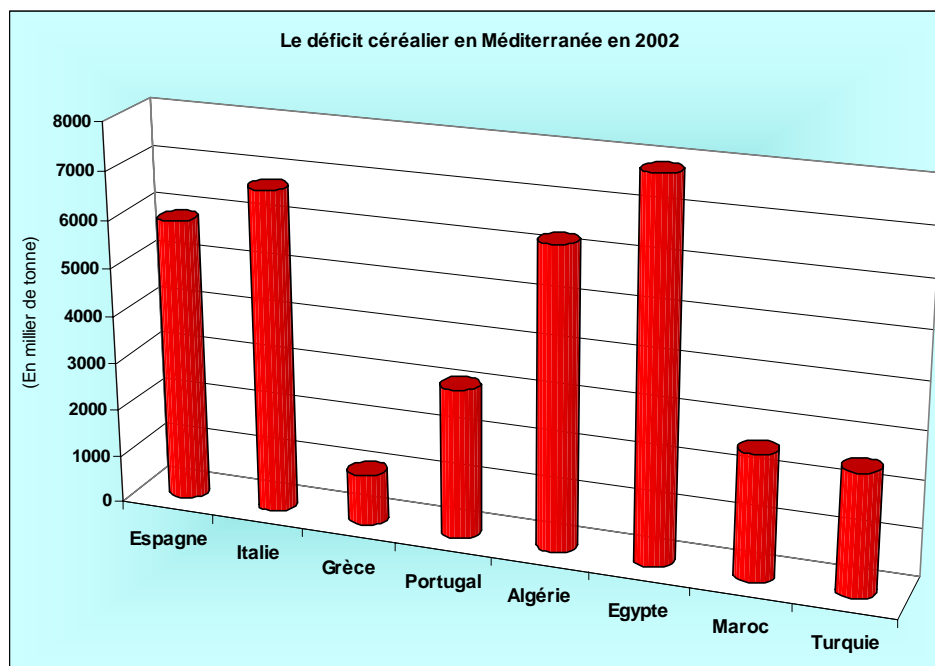
Wheat represents nearly 75% of all cereals imported by Italy, Algeria and Morocco. Since the eighties however growth in maize imports has gathered pace with the rapid development of animal production, notably in Spain, Greece, Turkey and Egypt. We should also note that cereals now account for 40% of agricultural imports to Morocco, Tunisia, Egypt and Algeria.

For many years now the Mediterranean’s cereal deficit has been growing⁶. Around 174.2 Mt of cereal was produced between 2001 and 2004 but total demand over the same period amounted to 185.6 Mt. The cereal deficit was therefore about 11.4 Mt. In 1982 on the other hand demand and production had been kept in balance and in the sixties the Mediterranean had even had a cereals surplus, with annual production at 79 Mt and demand not exceeding 76 Mt..

All countries in the zone, with the exception of France, have a cereals deficit. At this point we should emphasise France’s key role in maintaining the Mediterranean cereals balance. If France is left out of regional calculations, there is a fall in both production (from 174.2 to 110.6 Mt) and demand (from 185.6 to 148.3 Mt) and the total deficit for the Mediterranean rises from 11.4 Mt to 37.7 Mt. The scale of the problem is confirmed by an examination of national figures. The deficit is relatively low in some countries: Turkey (0.03 Mt), Malta (0.19 Mt), Albania (46.4 Mt) and Lebanon (0.83 MT); but very high in others: notably Egypt (7.9 Mt), Italy (6.7 Mt), Algeria (6.3 Mt) and Spain (5.9 Mt).

⁶ The deficit = the difference between each country’s output and total demand (for food and feed).

Cereal deficit in the Mediterranean in 2002



Sources: Our calculations based on CIHEAM-AgriMed 2006

4. The outlook for cereals in the Mediterranean

The outlook for cereals in the Mediterranean countries depends on various factors that determine development of supply and demand in each of the countries in the zone. As regards demand, the main factors are related to demographic growth, urbanisation and rising incomes. As to supply, the main determinants have to do with managing new techniques and making them generally available so that yields can be increased. The measures used to regulate supply and demand, depending on the force of their impact, will help to ensure more balanced markets.

If we try to sketch out development scenarios for supply and demand in each country, based on unstoppable trends observed over the past few decades, we can give a broad estimate of possible deficits or surpluses in cereal supply in 2015⁷.

⁷ These prospective studies were done by Mahmoud Allaya, Director of research at the Mediterranean Agronomic Institute of Montpellier (MAIM-CIHEAM), for the report AgriMed 2006, op.cit., pp 43-46. They were drawn up on the basis of projected trends for each country in the following areas: demography (United Nations projections), production (projections based on trends between 1961 and 2004), human consumption (projection from trends observed between 1992 and 2002), animal consumption (projection from trends observed between 1992 and 2002), other uses of cereals (seed, losses, non-food related uses, etc.: estimation based on trend observed between 1992 and 2002), total cereal demand was calculated by adding up human consumption, animal consumption and other uses; the deficit or surplus is the difference between production and total demand in each country.

	Population		Average human cereal consumption	Human cereal consumption		Animal cereal consumption	Total cereal demand by country	
	In thousands		kg/year	In thousands of tonnes		In thousands of tonnes	In thousands of tonnes	
Case	L*	H*	2015	L	H	2015	L	H
Albania	3,291	3,543	108	356	383	382	1,015	1,042
Algeria	36,467	39,817	223	7,669	8,069	2013	10,845	11,245
Egypt	86,200	93,693	226	19,479	21,172	13486	36,591	38,284
France	60,899	64,037	130	7,893	8,300	32937	48,189	48,596
Greece	10,782	11,106	149	1,637	1,687	3715	6,613	6,662
Italy	55,100	55,904	175	9,644	9,785	16829	28,227	28,368
Lebanon	4,015	4,307	124	499	536	659	1,214	1,250
Malta	406	416	232	94	97	157	266	268
Morocco	35,016	37,903	273	9,543	10,329	400	11,335	12,122
Portugal	9,933	10,124	144	1,426	1,454	4365	6,123	6,151
Spain	40,329	41,994	94	3,810	3,968	32666	40,133	40,290
Tunisia	10,594	11,638	195	2,063	2,266	2454	4,789	4,992
Turkey	78,463	85,837	198	15,540	17,000	11405	33,771	35,232

Sources: Our calculations based on CIHEAM-AgriMed 2006

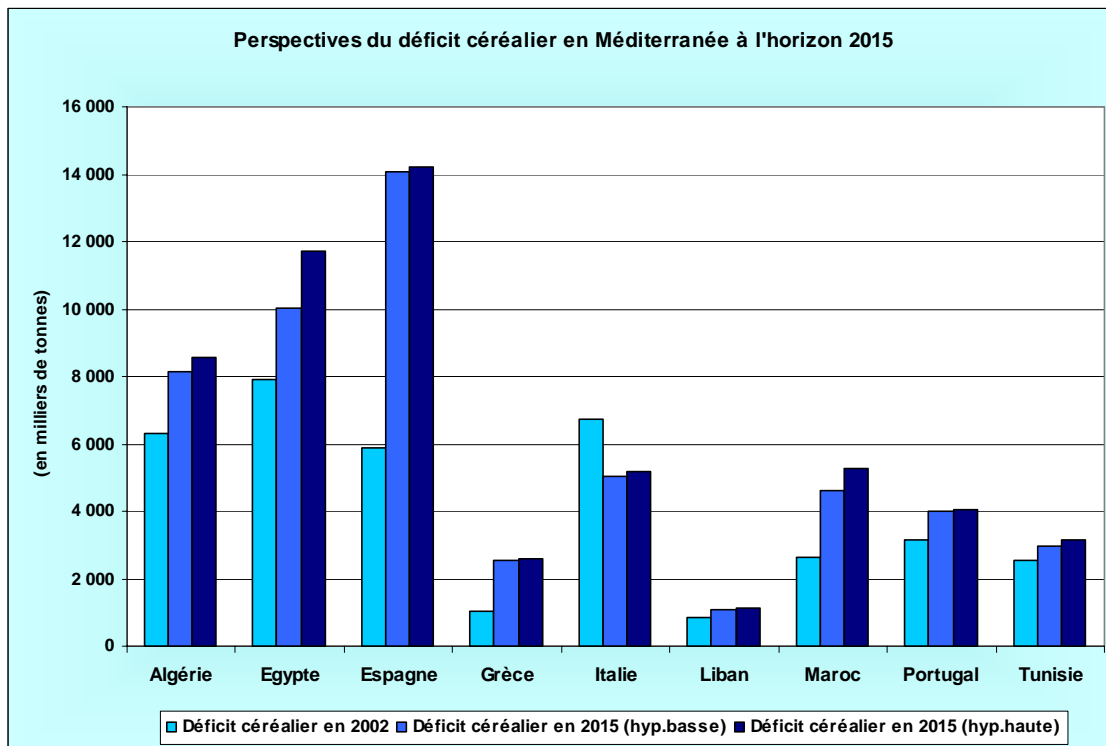
* Two alternative cases depending on high (H) or low (L) demographic projections by the United Nations (World population prospects 2002)

	Cereal production in 2015	Total cereal demand in 2015		Cereal deficit in 2015		Cereal deficit in 2002
	In thousands of tonnes					
Case		L	H	L	H	
Albania	320	1,015	1,042	695	722	464.1
Algeria	2,700	10,845	11,245	8,145	8,545	6,303
Egypt	26,569	36,591	38,284	10,022	11,715	7,883
France	81,234	48,189	48,596	-33,045	-32,638	-26331.5
Greece	4,064	6,613	6,662	2,549	2,598	1,046.3
Italy	23,178	28,227	28,368	5,049	5,190	6,747.9
Lebanon	132	1,214	1,250	1,082	1,118	828.7
Malta	316	266	268	-50	-47	186.2
Morocco	6,715	11,335	11,989	4,620	5,274	2,627.9
Portugal	2,108	6,123	6,151	4,015	4,043	3,136.6
Spain	26,067	40,133	40,290	14,066	14,223	5,905
Tunisia	1,837	4,789	4,992	2,952	3,155	2,537.9
Turkey	34735	33,771	35,232	-964	496	34.5
Total	209,975	229,111	234,369	19,136	24,394	11,369.6

Sources: Our calculations based on CIHEAM-AgriMed 2006

And so in 2015 total cereal demand would be 229.1 Mt in the lowest case scenario and 234.4 Mt in the highest. Both of these figures are much higher than for 2002 (185.6 Mt). It is highly likely that cereal demand will increase in the coming years.

Possible cereal deficit in the Mediterranean in 2015

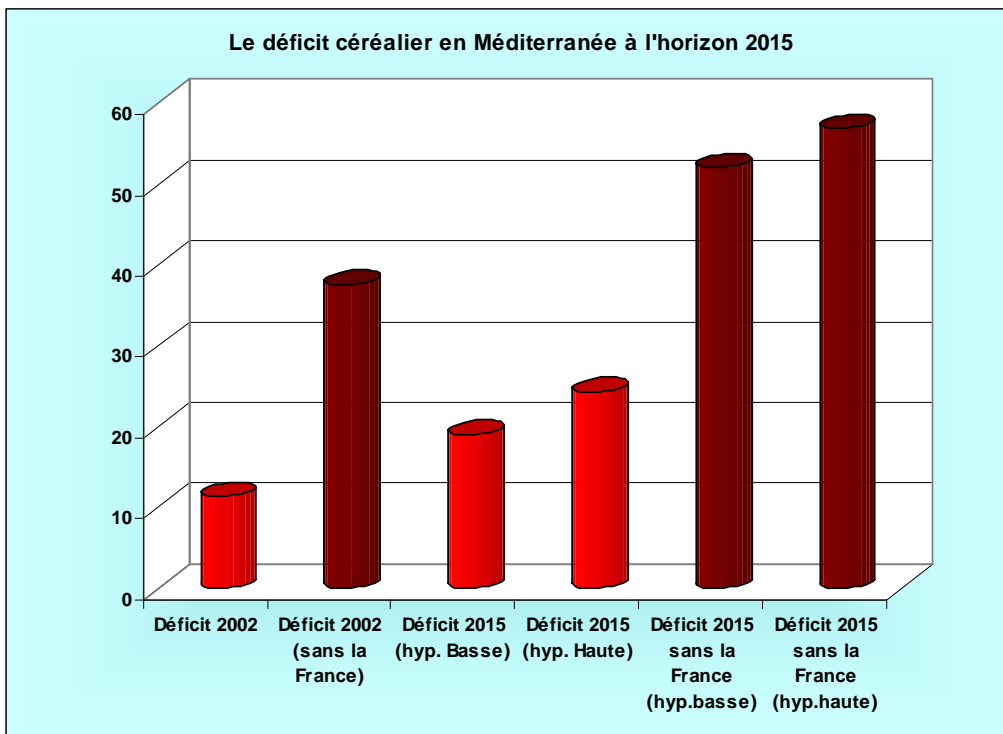


Sources: Our calculations based on CIHEAM-Agrimed 2006

At the same time the cereal deficit would increase a little more, rising to 19.1 Mt or 24.4 Mt depending on whether the high or low case scenario is used. This would make the figures twice as high as in 2002. Again, it is a good idea to show what the figures are if France is left out of the equation. In that case the Mediterranean cereal deficit is 52.2 Mt (low case) or 57 Mt (high case), whereas in 2002 it was only 37.7 Mt. There can be no doubt that the cereal deficit will increase in the next few years. Moreover, even with the rise in production, deficits are likely to increase in each of the countries in the zone (particularly Spain), with the exception of Italy.

These deficits are often generated by a strong increase in demand for cereal feed. By 2015 animal feed is likely to account for more than 50% of cereal demand in Spain, Portugal, France, Italy, Greece and Malta. The figure will probably be between 30% and 50% in Turkey, Tunisia, Egypt, Lebanon and Albania. However, cereal for direct human consumption will continue to account for the bulk of demand in Morocco (84%), Algeria (71%) and Egypt (53%).

The cereal deficit in the Mediterranean in 2015



Sources: Our calculations based on CIHEAM-AgriMed 2006

Conclusion

Cereals have unquestionably become strategic products for the Mediterranean Basin countries over the past forty years. Cereals imports to the region continue to increase, both to meet the requirements of the growing population and to make up for insufficient productivity.

The import of cereals on a massive scale by countries with low revenues clearly raises the question of populations' food security. A country that fails to ensure self-sufficiency is obviously required to import, and must wield significant buying power. While Algeria is able to provide for its needs on the international markets thanks to its oil revenues, not all Mediterranean countries are in the same position. Failure to increase agricultural output in countries to the South of the Mediterranean could lead to quite serious economic and social problems. This is what prompts the urgent need to implement national agricultural policies suited to these countries while building up closer Euro-Mediterranean cooperation on agricultural matters in order to meet the challenge posed by cereals in the region.