

LMC INTERNATIONAL

Study On The Cotton Sector

In The European Union

Final Report

Executive Summary

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Table of Contents

Executive Summary	E1
The EU Cotton Regime.....	E1
Principles.....	E1
Regime Expenditure.....	E2
Methodology.....	E3
The EU Cotton Sector.....	E3
Cotton Production.....	E3
Cotton Ginning.....	E5
Cotton Regime Pre-Reform.....	E5
The Reform of the Cotton Regime.....	E7
Impact of Changing the Cotton Regime.....	E11
The Deficiency Payment System.....	E11
The 2004 Reform, Implemented in 2006.....	E11
Full Decoupling.....	E13

List of Tables

Table EXEC 1: Cotton Area Payments in 2006.....	E2
Table EXEC 2: Family Labour Use.....	E4
Table EXEC 3: Cotton Area and Production, Pre-2006 Reform.....	E6
Table EXEC 4: Cotton Area and Production, 2004 Reform Scenario.....	E11
Table EXEC.5: Spain, the Impact of Changes in Coupled Payments on the Sector.....	E12
Table EXEC.6: Greece, the Impact of Changes in Coupled Payments on the Sector.....	E13

List of Diagrams

Diagram EXEC 1: EU Cotton Area.....	E4
Diagram EXEC 2: Gross Margin Cotton vs. Alternative Crops Pre-2006 Reform.....	E5
Diagram EXEC 3: Comparison of Average US and EU Ginning Capacity Utilisation Rates, 2003-2005.....	E6
Diagram EXEC 4: Change in Area and Yields, 2006 vs. 2005.....	E8
Diagram EXEC 5: Spain, Gross Margins for Cotton vis-à-vis Competing Crops, After Reform.....	E9
Diagram EXEC 6: Greece, Gross Margins to Cotton vis-à-vis Competing Crops, After Reform.....	E10
Diagram EXEC 7: Gross Margins with Full Decoupling in Spain.....	E13
Diagram EXEC 8: Cotton vis-à-vis Competing Crops, Full Decoupling, Greece.....	E14

Executive Summary

The objectives of this study are threefold, to:

- Assess the impact of the changes implemented in the cotton regime in 2006 on cotton production and the relative profitability of cotton vis-à-vis alternative crops;
- Assess the impact of the reform in the regime on the ginning industry; and
- Assess the impact of different policy scenarios on producers and ginners.

THE EU COTTON REGIME

The Common Market Organisation for cotton was introduced in 1981 with the accession of Greece to the Community and the CMO (the “cotton regime”) was extended in 1986 with the accession of Spain and Portugal.

Protocol 4 established the Community support programme for cotton. According to the Protocol, the support system is intended “particularly to support cotton in the regions of the Community where it is important for the agricultural economy, to permit producers concerned to earn a fair income and to stabilise the market by structural improvements at the level of supply and marketing.”

Principles

Prior to the reform approved in 2004 (which was first put into effect in 2006), the basic principles of the regime were that:

- Producers received a minimum price per tonne for unginning cotton.
- This price comprised an unginning cotton price, which was derived from the world ginning cotton market price, plus a payment from the EC.
- The payment from the EC was made to ginners, who transmitted it to growers.
- When cotton production exceeded certain reference levels, a stabiliser mechanism was applied which reduced the minimum price with a view to lowering grower prices and hence discourage over-production.

In 2003, the Mid-Term Review of the Agenda 2000 Reforms provided a far-reaching general reform of the Common Agricultural Policy (CAP). The guiding principle was a move away from price support and production support for specific crops to one of direct support for farmers’ incomes. The cotton regime was brought into line with the other sectors of the CAP in 2004 and the reforms were introduced in 2006.

Following the reform, the Aid was transformed from one based on price supports to one relying on an area payment, which was partially decoupled. The decoupled component (65% of the total Aid¹) was paid irrespective of the farmer’s production decision, while the coupled payment was triggered by the opening of the cotton boll rather than the harvesting of the seed cotton.

¹ The Spanish Government took advantage of the option, under Article 69 of Regulation 1782/2003, to reduce the decoupled payment by 10% and add it to the coupled payment.

The split between coupled and decoupled payments is summarised in Table EXEC 1.

Table EXEC 1: Cotton Area Payments in 2006 (€/hectare)

	Base Area ha	Decoupled Payment 65%	Coupled Payment 35%
Greece ¹	370,000	966	594 - 342.85
Spain	70,000	1,358 ²	1,039
Portugal	360	1,202	556

Note: 1. For Greece €594 per hectare is payable on 300,000 hectares and €342.85 on 70,000 hectares.

2. The decoupled payment for Spain was reduced below 65% because 10% of the decoupled payment was replaced by a coupled payment. This was permitted under Article 69 of Regulation 1782/2003

Source: DG Agri.

The reformed cotton regime was challenged by the Spanish Government, and following the Court of Justice finding against the EC, the Court annulled the reform. The Court found against the EC due to a breach of the principle of proportionality. In particular, the Court found in Spain's favour on two grounds:

- The EC failed to carry out an impact study; and
- The EC failed to include direct labour costs in the calculations.

The system was allowed to continue to operate until a new regulation was drawn up.

Regime Expenditure

Under the old regime, EC expenditure on the regime comprised two components:

- Aid to the growers; and
- An administrative fee paid to the ginners (of €53.1 per tonne, unginned cotton).

Expenditure on cotton aid had a floor of €770 million. During periods when this level of expenditure would not otherwise have been reached, a higher price was paid to growers. This occurred in 1996, 1998 and 2001.

Expenditure peaked at €952 million in 2005. Between 2001 and 2005, the annual average amount paid to growers was €761 million, while the administrative fee paid to the ginners averaged €78.3 million.

Under the reformed regime introduced in 2006, the total aid targeted at cotton growers was set at €803 million, based on the average budget spent on production aid over the reference period (2001 to 2003).

This budget was allocated in the following manner: rural development €22 million, decoupled aid €502 million and coupled aid €275 million. The balance of €4 million was to be used to assist the creation of Inter-branch Organisations. The ginners do not receive any of the Aid.

METHODOLOGY

In order to analyse the regime, we use a methodology based on gross margins (the difference between revenue and variable costs). We focus on two measures: (a) the gross margin (excluding family labour) per hectare, because this is the preferred method of measuring profitability cited by growers², and (b) the return per hour of family labour (gross margin divided by the amount of family labour).

We have based our estimates of family labour time on FADN data, which is a source that provides data across countries and crops. However, there are concerns regarding the reliability of these data. This arises from the nature of family labour; for instance, if a farmer's sole employment is in farming, the full year's labour time will be allocated to it, while in reality only a proportion of labour time is actually spent on agricultural tasks. Accordingly, the FADN estimates are likely to overestimate the amount of time spent on a particular crop³ and conversely underestimate the return to labour. In addition, there appear to be inconsistencies between the bases on which estimates were prepared of labour use for the same crops in different member states.

The major data sources analysed for this study are: (a) FADN data for farms specialising in cotton and the major competing crops; (b) a questionnaire undertaken of a sample of producers and ginners; (c) private data sources (a database of farm costs for Spain and financial returns from the Greek ginning industry); and (d) official data from governments and industry associations.

THE EU COTTON SECTOR

Cotton Production

Cotton is produced in four EU-27 states, namely Greece, Spain, Portugal⁴ and Bulgaria. Production is dominated by Greece and Spain.

The EU-15 cotton area grew steadily until the end of the 1990s, peaking at almost 540,000 hectares in 1999/2000. Since then the area under cotton has stabilised at 450,000 hectares (Diagram EXEC 1).

Greece is the largest producer in the Community and there are 79,700 farmers involved in cotton farming; these are concentrated in Anatoliki Makedonia, Kentriki Makedonia, Thessalia and Sterea Ellada. Cotton accounts for 9.1% of final Greek agricultural output. The majority of farmers grow between 2 and 5 hectares of cotton.

Cotton is cultivated on some of the best agricultural land. The main competing crops are cereals, particularly durum wheat⁵ and maize. Over 99% of Greek cotton production is grown using irrigation.

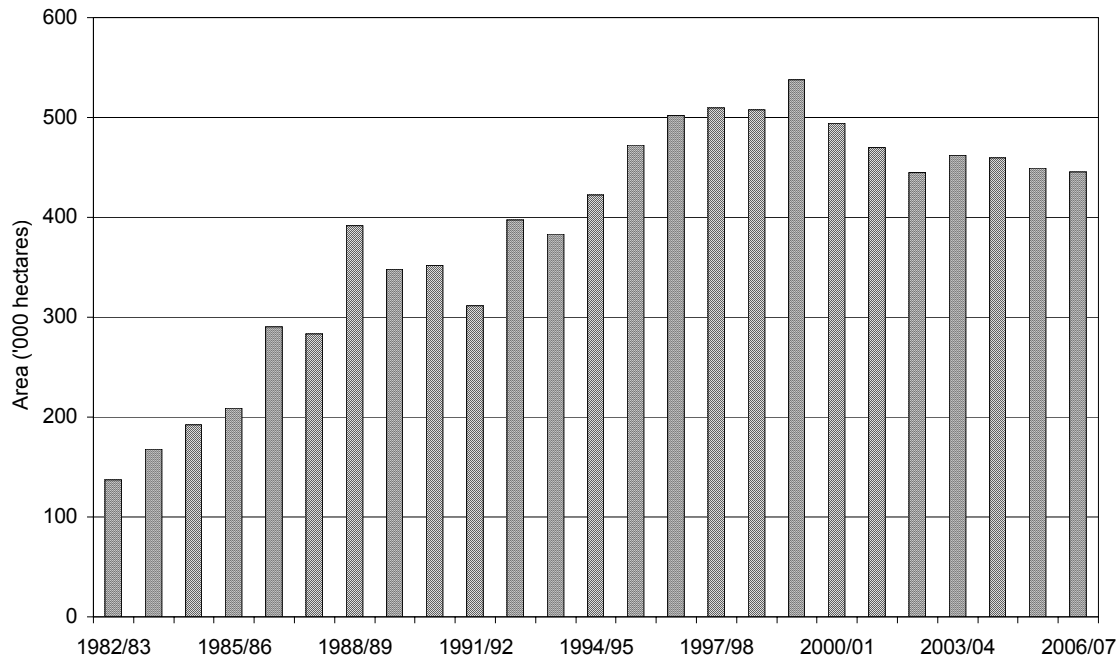
² In the questionnaire growers were asked how they measure profitability. The most common response in both Greece and Spain was (revenue minus cash costs).

³ This is confirmed by the questionnaire data where farmers were asked about the amount of time spent in practice on specific agricultural activities.

⁴ With only small volumes produced in Portugal, unginning cotton was sent to Spain for ginning.

⁵ Following the cereal reform in 2006, the area under soft wheat has increased in both Spain and Greece, often at the expense of durum wheat. This is because the old cereal regime favoured durum wheat.

Diagram EXEC 1: EU Cotton Area



Note: Spanish data are only included from 1986/87 with its accession to the EU.
Source: DG Agri, National Authorities

Andalucia accounts for 98% of cotton output in **Spain**. 9,500 farmers in the region are cotton producers. Cotton accounts for 1.3% of final Spanish agricultural output. Within Andalusia cotton accounts for 4.9% of final agricultural output, and is particularly important in Sevilla (11.2%), Cadiz (5.9%) and Cordoba (3.2%).

Most Spanish farmers grow under 10 hectares of cotton, but 5% of the cotton farms cultivate over 50 hectares of cotton. Competing crops include: wheat, maize, sunflower and sugar beet. Over 95% of production is produced under irrigated conditions.

In both countries, cotton is a large user of family labour. FADN data imply that cotton requires more hours of labour per hectare than major competitors (Table EXEC 2). The findings of the questionnaire suggest that FADN data overstate the hours spent on cotton production, but that cotton is still the most important user of household labour.

Table EXEC 2: Family Labour Use (hours per hectare per annum)

	Cotton	Durum Wheat	Maize	Sunflower
Macedonia	195	79	194	
Thessalia	220	98	194	
Spain	182	134	103	60

Note: Data collected from the questionnaires puts cotton household labour use lower than that of FADN. For Greece, household labour use varied from 75 to 90 hours per hectare, while in Spain household labour use varied from 23 to 60 hours per hectare.

Source: FADN.

Cotton Ginning

The ginner purchases unginning cotton from farmers and processes it into ginned cotton and cottonseed. In both Greece and Spain, the ginner is a specialist and

derive most of their income from ginning and related activities. In Greece, a number of ginners also crush cottonseed to produce cottonseed oil and meal.

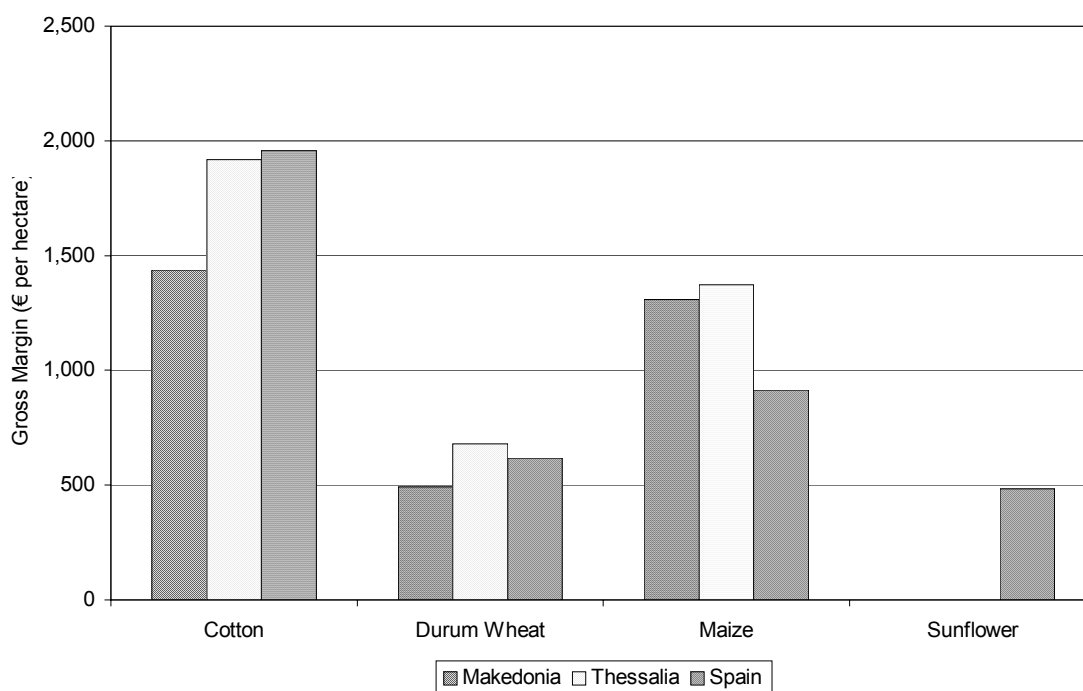
73 ginning mills were active in Greece in 2005/06. On average, each Greek ginning mill employs 10 permanent and 30 seasonal workers; this suggests that total employment in the sector is almost 3,000 workers (730 full time and 2,200 part time).

Out of a total of 29 ginning mills, 27 were active in Spain in 2005/06 prior to the reform. In 2004, total employment in the Andalusia cotton-ginning sector (accounting for 85% of gins) was 1,170 workers, comprising 250 permanent and 920 seasonal workers (equivalent to 11 permanent workers and 40 seasonal workers per mill on average). Scaling up the Andalusia figures pro rata to its share of national gin numbers, the Spanish total employment in cotton ginneries was estimated at 1,350 workers, divided between 290 permanent and 1,060 seasonal employees.

COTTON REGIME PRE-REFORM

The old cotton regime was based on a per tonne payment for unginmed cotton which encouraged a high input-high output system with high agricultural yields. Under this regime, cotton had the highest gross margins and returns per day of family labour of the major crops competing for potential cotton farming land (Diagram EXEC 2). Following the changes to the regime in 2000, the level of profitability was such that the incentives were sufficient to maintain production rather than expand it (Table EXEC 3). This is in contrast to previous regimes, under which production continued to expand.

Diagram EXEC 2: Gross Margin Cotton vs. Alternative Crops Pre-2006 Reform



Source: LMC estimates

Table EXEC 3: Cotton Area and Production, Pre-2006 Reform

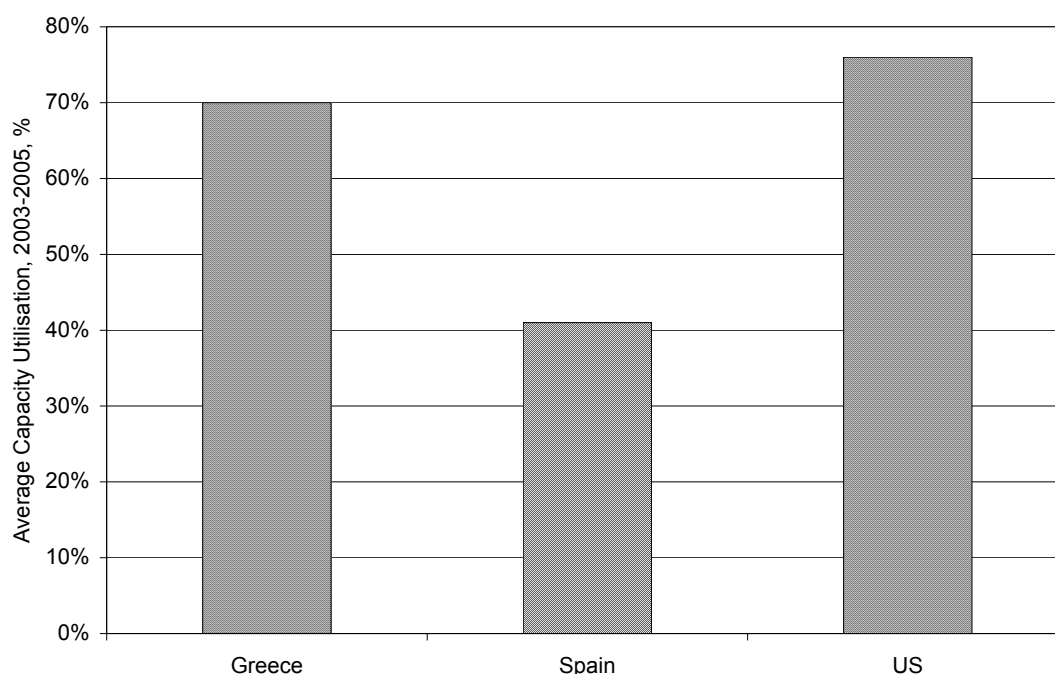
	2003	2004	2005
Greece			

Area (ha)	367,472	369,500	363,000
Production (tonnes)	1,006,248	1,137,229	1,124,714
Yield (t/ha)	2.7	3.1	3.1
Spain			
Area (ha)	94,999	90,297	86,058
Production (tonnes)	305,417	368,097	355,482
Yield (t/ha)	3.2	4.1	4.1

Source: DG Agri.

Prior to the regime change that was implemented in 2006, there was overcapacity in the ginning industry. On a standardised basis⁶, capacity utilisation in Greece was estimated at 70% in 2003-2005, while in Spain capacity utilisation was estimated at 41%. In the US capacity utilisation is estimated around 75% (Diagram EXEC 3).

Diagram EXEC 3: Comparison of Average US and EU Ginning Capacity Utilisation Rates, 2003-2005



Source: LMC estimates

There are a number of reasons that led to this overcapacity:

- Ginning was profitable which encouraged its expansion. Profit as a proportion of revenue averaged 14% in Greece and 19% in Spain in 2004 and 2005.
- Ginning unit costs were high by international standards, partly as a result of over capacity. High costs were absorbed via the cotton regime, for two reasons:

⁶ The number of days of operation of the gins and hours worked per day varies considerably by country and company. In order to provide an objective measure of capacity, we have calculated capacity on the basis of US industry parameters (an 81 day season with an average operating time of 17.5 hours). This puts total ginning capacity at 0.86 million tonnes unginning cotton in Spain and 1.60 million tonnes unginning cotton in Greece.

- The unginning cotton price (which determined the payment of aid) was set at a level between 20.6% and 24.4% of the international price for ginned cotton⁷. For the ginner, this yielded a margin that equalled the difference between the sales price for ginned cotton and the calculated unginning cotton price. This margin had little relationship to an estimate of efficient ginning production costs.
 - The administrative element of the Aid was greater than the cost of administering the scheme; hence, this component provided an implicit subsidy to the ginner.
- In Greece, the high cotton prices seen during the period of 1995-1999 stimulated Turkey to expand its textile production, and in turn, Greece expanded its cotton production. By 2000, Greek ginneries had expanded processing capacity to meet the demand for more cotton. Production however, did not increase further.

THE REFORM OF THE COTTON REGIME

The change in the cotton regime to a partially decoupled area-based system and the decoupling of the cereal regime⁸ have led to a fall in gross margins⁹ for producers of both of these crops (total farm incomes were not affected in the same manner, since decoupled payments were increased alongside the reductions in price supports).

The reactions of producers to this changed situation were very different in Spain and Greece (Diagram EXEC 4).

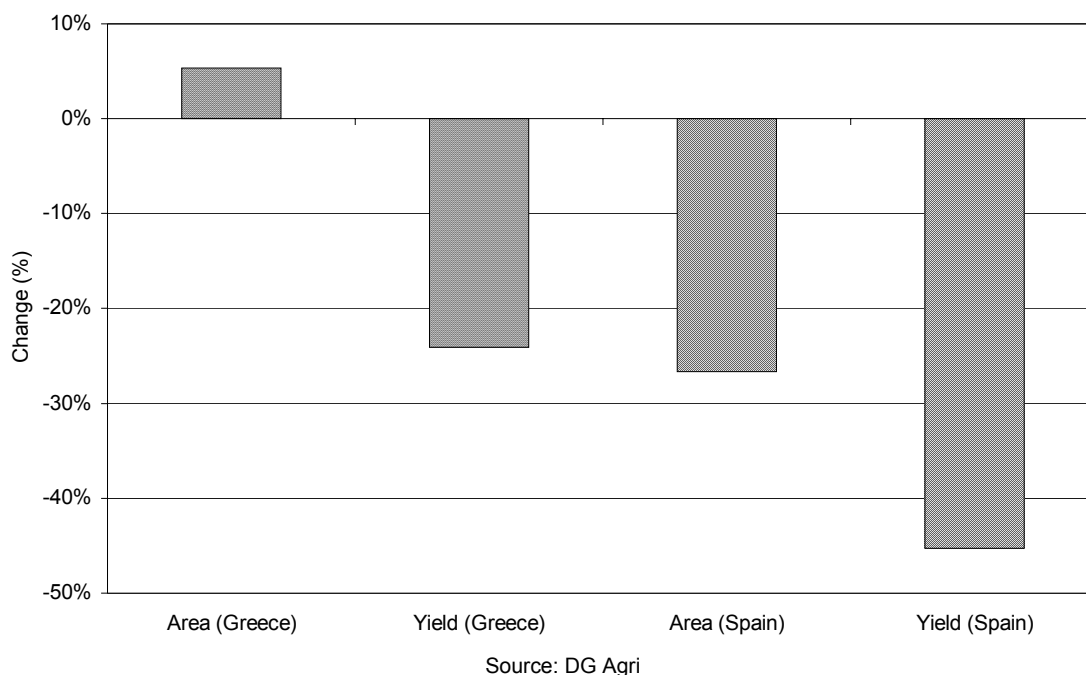
- Both the area under cotton and yields fell sharply in Spain (by 45% and 27%, respectively).
- In Greece, by contrast, the area under cotton rose by 4%, while average yields fell in Greece (by 24%).
- The decline in yields in Greece was caused by poor weather, and was not the consequence of regime change.

Diagram EXEC 4: Change in Area and Yields, 2006 vs. 2005

⁷ The actual amount varied according to the underlying world price.

⁸ In Greece, cereals were fully decoupled, while in Spain 25% of the support remained coupled.

⁹ In the calculation of gross margins, we do not include the decoupled payment, since this does not affect returns when producers make their crop choices at the margin.



In **Spain**, following the change in the regime, producers faced a number of production options:

1. To maintain production using traditional production techniques with high input use and high yields (of around four tonnes per hectare);
2. Reduce input use (and per hectare production costs) and then claim an agri-environmental payment, which is paid in addition to the income from the market-determined cotton price and the coupled aid.
3. Reduce input use, but not claim the agri-environmental payment, because of the bureaucratic procedures that have to be followed to receive the payment.
4. Reduce inputs to a minimal level, but a level just sufficient to receive the coupled payment. In this case, farmers only harvest the cotton if the revenue from cotton sales is sufficient to cover harvesting and transport costs.
5. Switch out of cotton to alternative crops. Our analysis is based on the assumption that farmers would switch to durum wheat, maize or sunflower. These crops have historically been considered to be the main alternatives by farmers. Another alternative, which has become an option following the reform of the cereals regime¹⁰, is soft wheat. However, in our analysis, at least for the first year following the regime, we discount soft wheat as an option, since cotton farmers' experience is overwhelmingly with growing durum wheat, rather than soft wheat. This practical constraint upon switching to soft wheat would be expected to weaken in the longer term.

Following the reform, the gross margin in Spain for cotton is found to be higher than that earned on the main alternatives when agri-environmental payments are received

¹⁰ This has occurred because, under the old cereals regime, substantial additional payments were made to growers of durum wheat in traditional areas.

(Diagram EXEC 5). Although these payments are independent of the cotton regime, they have proved to be an important part of the farmers' decision-making process and the area that qualified for the payment increased dramatically in 2006 (from 20,000 to 50,000 hectares). For farmers who received these payments, the area under cotton was largely maintained at 2005 levels, albeit with a less intensive production system (yields have fallen by over 40% to approximately 2.5 tonnes per hectare).

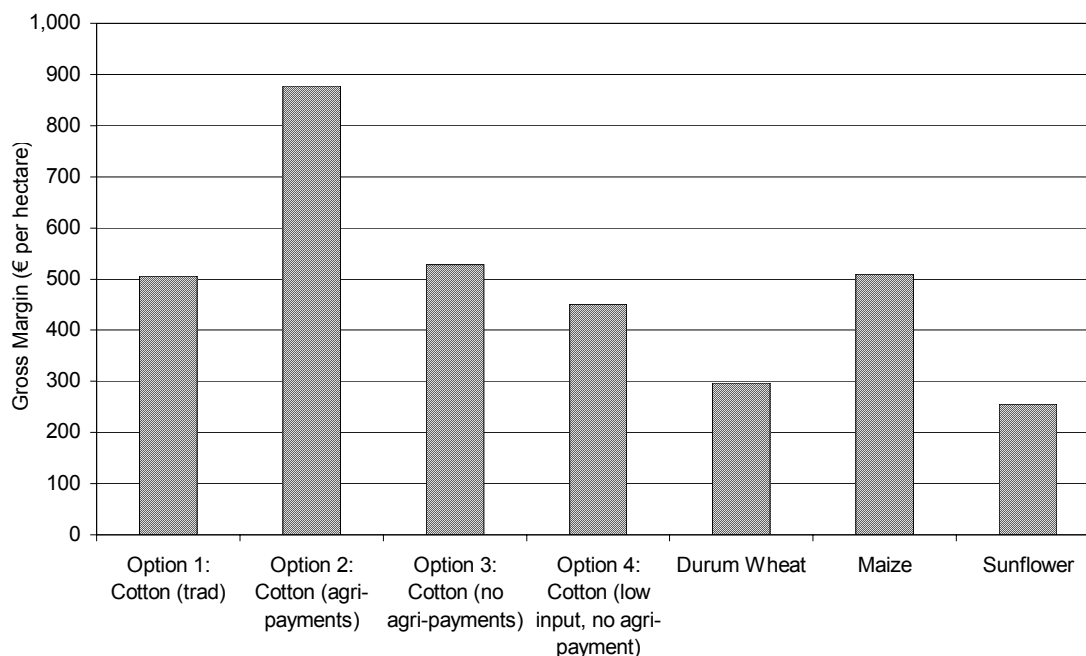
For farmers who did not receive the agri-environmental payment, the area under cotton fell dramatically (to 14,000 hectares) as farmers switched to more profitable alternatives, notably maize, but also other crops such as citrus, olives, etc.

Even where production has been maintained without the agri-environmental payment, the questionnaire responses suggest that yields have fallen. This is in line with the analysis of gross margins (Diagram EXEC.5) which suggests that gross margins are higher for a system with lower inputs (Option 3) than one with higher inputs and high yields (Option 1).

Where yields are reduced further by operating a low input-low output cotton farming system (Option 4), the gross margins fall further. However, in practice, some Spanish cotton producers are reported to have switched to this option. This option has the attraction of affording the least risk to producers, while also requiring the smallest cash outlay.

Returns per day of family labour under Option 4 prove to be slightly higher than those with Option 3. Under Option 4, if yields are low enough, it can also be advantageous for the farmer not to harvest cotton and accept the coupled payment on boll opening.

Diagram EXEC 5: Spain, Gross Margins for Cotton vis-à-vis Competing Crops, After Reform



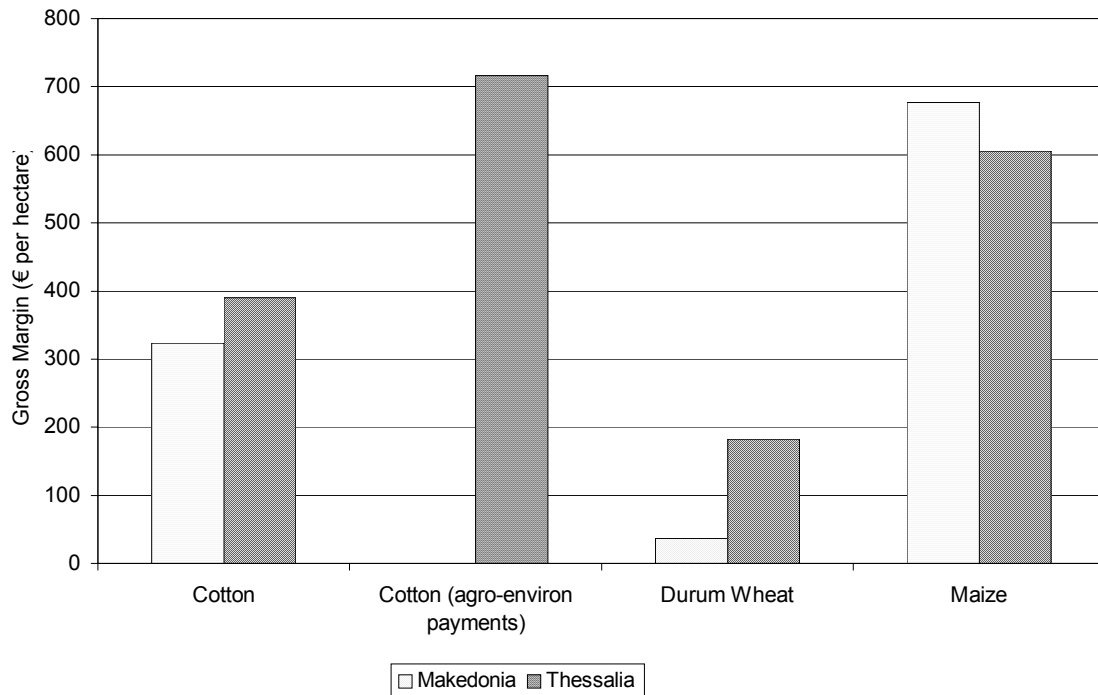
Source: LMC estimates

In **Greece** producers reacted much less than in Spain to the reform and the area under cotton actually rose in 2006. This was partly because returns to other crops have fallen with the full decoupling of the cereal regime. The returns to durum wheat, which is considered the main alternative crop by producers, are below those of cotton (Diagram

EXEC 6). The anomaly is maize, which in some cases yields a higher gross margin than cotton, and yet producers did not switch to it. In the short run, this is due to technical and economic factors, such as the nature and timing of irrigation. In addition, there is a degree of inertia among Greek producers. The size of farms is relatively small and it is expected to take longer for producers to switch to alternative crops.

As with Spain, returns to producers receiving agri-environmental payments are higher than for alternative crops. However, these payments are only available in Thessalia and there has been no increase in the overall crop area receiving these payments.

Diagram EXEC 6: Greece, Gross Margins to Cotton vis-à-vis Competing Crops, After Reform



Source: LMC estimates

With lower production, **ginning** capacity utilisation fell to 17% in Spain. In Greece capacity utilisation fell to 56%, but this was more a reflection of the effect of poor weather than the change in the regime. With more normal weather conditions, capacity utilisation would have remained close to 70%.

The regime change has also made a difference in terms of **quality**. The quality of unginned cotton from the 2006 crop was poor in both Greece and Spain. Some diminution of quality was a result of bad weather in Greece, but the greatest impact came as a result of poorer farm management. Lower fertiliser and irrigation application rates in Spain resulted in shorter fibre length; also many farmers did not defoliate before harvesting, which increased the amount of leaf impurities reported in the unginned cotton. Another factor that has acted to reduce the quality of both Greek and Spanish cotton in recent years, but which is not related to the new regime, is the increasing use of stripper harvesters.

IMPACT OF CHANGING THE COTTON REGIME

The impact of three alternative sets of measures is contrasted. These measures are:

- A return to a deficiency payment system;
- The 2004 reform, but with the possibility of varying the share of decoupling; and
- Full decoupling.

The Deficiency Payment System

This refers to a system where aid is paid per tonne of unginned cotton. This is the same as the measures in effect prior to the reform. To analyse the outcome of this system, we examine the gross margins that existed prior to the reform for cotton with those of the main competing crops. Under this system, the gross margins and returns per day for cotton were considerably higher than those of other crops and we would expect the area under cotton and yields to remain at pre-reform levels (these are listed in Table EXEC.3, above).

The 2004 Reform, Implemented in 2006

Following the reform, returns to cotton farmers in 2006 changed from a single payment made by ginners, including the Aid, to a payment from ginners (based on world prices) plus a cotton area payment (the coupled payment). The effects of the reform are discussed above. Under the reform, the area under cotton and yields declined in Spain, but the area was unchanged in Greece (the fall in yields in Greece in 2006 was due to climatic factors, rather than the reform). For the gins, capacity utilisation fell in Spain, but would have remained unchanged in Greece with normal weather (Table EXEC.4).

In the absence of additional agri-environmental payments in Spain, the area under cotton would have fallen further in 2006. In this case, if we assume that farmers who had received the payment would have behaved in the same way as those who did not receive the payment, the area under cotton would have fallen to 33,800 hectares in 2006 (which compares with the actual planted area of 63,100 hectares that year).

Table EXEC 4: Cotton Area and Production, 2004 Reform Scenario

	Reform Scenario	No increase in agri-payments
Greece		
Area (ha)	362,000	
Production (tonnes)	1,122,200	
Yield (t/ha)	3.1	
Capacity Utilisation	69%	
Spain		
Area (ha)	63,119	33,783
Production (tonnes)	164,109	87,835
Yield (t/ha)	2.6	2.6
Capacity Utilisation	19%	10%

Note: Spanish yields are based on questionnaire responses.

Source: LMC

We are able to model the impact of changing the regime by making use of the observed responses in 2006 (for Spain) and an analysis of the questionnaires prepared for this report. In the questionnaires, farmers were asked what would be the effect of changes to the coupled payment on their planted areas. The results are presented in Tables EXEC.5 and EXEC.6.

As the level of coupled payment falls, so the gross margin for cotton falls and producers switch to alternative crops. In the case of Spain, a 30% (or €300 per hectare) fall in the coupled payment would lead to a reduction in the planted area of 17,000 hectares. In the absence of agri-environmental measures, the same reduction in the coupled payment would reduce the planted area to 10,000 hectares.

In terms of production, under the reform's system of coupled payments, gross margins are always higher for the medium level input system (Options 2 and 3) than with a high input system (Option 1); hence, average Spanish yields would be expected to remain around a level of 2.6 tonnes per hectare.

For some Spanish producers, a low input-output system (Option 4) may be more advantageous, and this would reduce yields further. Under this low intensity system, the incentives are for producers to reduce costs as much as possible in order to maximise the gross margin, since the trade-off between higher inputs and higher yields does not favour higher inputs.

For the Spanish gins, the medium level input options (Options 2 and 3) would mean that capacity utilisation never rises above 25% (Table EXEC.5).

In Greece, a 30% (or €160 per hectare) fall in the coupled payment would reduce the cotton area by 100,000 hectares. In terms of production, the reform's coupled payments always leaves gross margins higher for the high input-high output system, and hence yields remain around 3 tonnes per hectare.

For the Greek gins, a 30% fall in the coupled payment would reduce capacity utilisation to 49% (Table EXEC.6).

Table EXEC.5: Spain, the Impact of Changes in Coupled Payments on the Sector

Change in Coupled Payment	Coupled Payment € per ha	Total Area (hectares)	Production (tonnes unginned cotton)	Capacity Util %	Area (no agri-env payments) (hectares)	Production (tonnes unginned cotton)	Capacity Util %
+ 50%	1,559	82,625	214,825	25%	77,875	202,475	24%
+ 40%	1,455	80,539	209,401	24%	72,934	189,629	22%
+ 30%	1,351	77,497	201,493	23%	65,787	171,045	20%
+ 20%	1,247	73,416	190,881	22%	56,333	146,465	17%
+ 10%	1,143	68,478	178,042	21%	45,208	117,540	14%
0%	1,039	63,119	164,109	19%	33,783	87,835	10%
- 10%	935	57,540	149,604	17%	23,578	61,304	7%
- 20%	831	51,809	134,704	16%	15,540	40,404	5%
- 30%	727	45,515	118,339	14%	9,812	25,511	3%
- 40%	623	38,193	99,302	12%	6,015	15,639	2%
- 50%	520	29,892	77,720	9%	3,618	9,406	1%

Source: Chapter 5.

Table EXEC.6: Greece, the Impact of Changes in Coupled Payments on the Sector

Change in coupled payment	Coupled Payment € per ha	Area 000 ha	Production 000 tonnes	Yield T/ha	Capacity Util (%)
+ 50%	794	494	1,554	3.1	96%
+ 40%	741	470	1,474	3.1	91%
+ 30%	688	445	1,393	3.1	86%
+ 20%	635	410	1,280	3.1	79%
+ 10%	582	379	1,178	3.1	73%
0%	529	362	1,123	3.1	70%
- 10%	476	320	990	3.1	61%
- 20%	423	295	908	3.1	56%
- 30%	370	262	798	3.0	49%
- 40%	317	241	729	3.0	45%
- 50%	265	220	660	3.0	41%

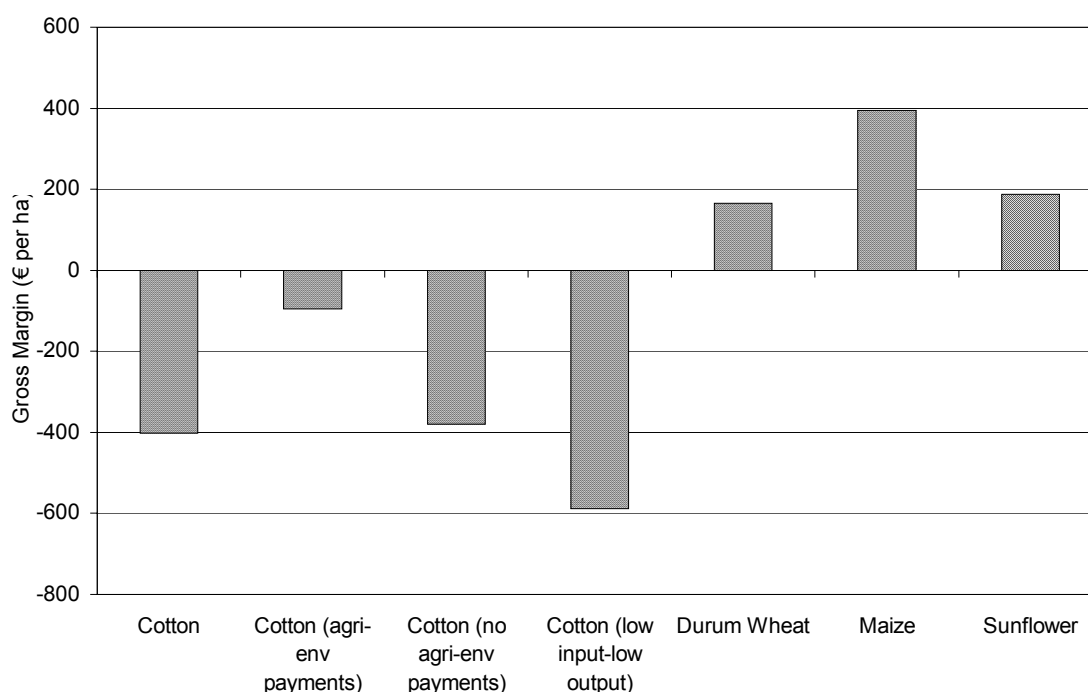
Source: Chapter 5.

Full Decoupling

With full decoupling, where we assume that cereals are also fully decoupled, margins for cotton in Spain turn negative (Diagram EXEC 7). Thus we would expect the area under cotton to fall to zero.

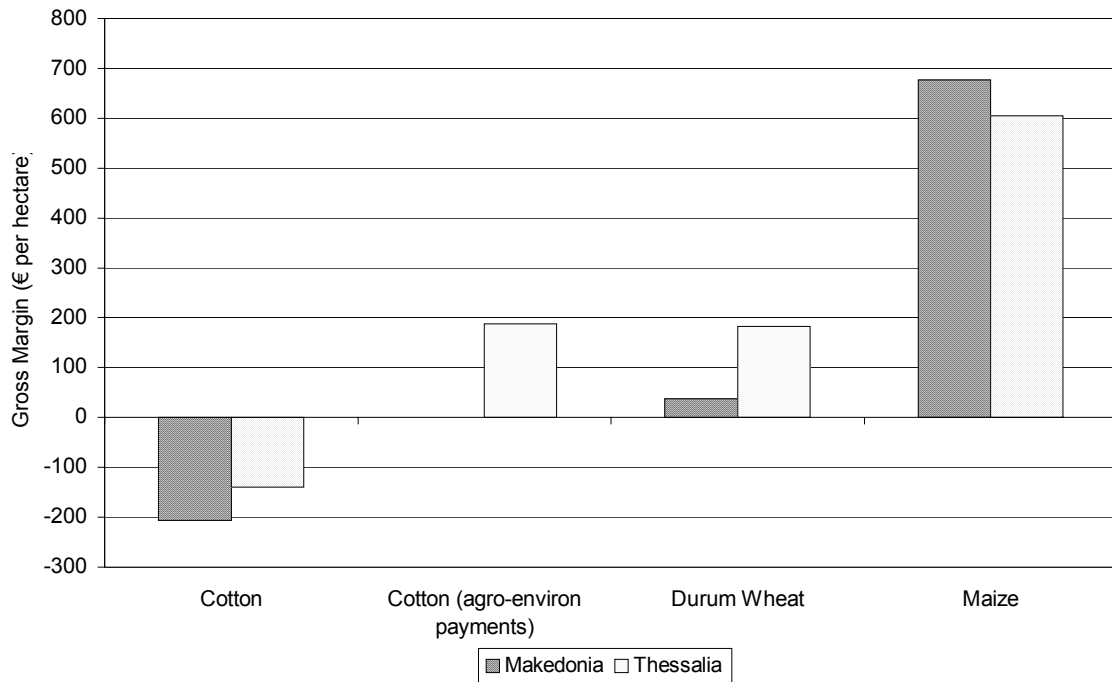
In Greece cotton margins turn negative except where agri-environmental payments are made (Diagram EXEC 8). We would expect the cotton area to decline in the first instance to the area that receives these payments, at present this amounts to 93,000 hectares, all in Thessalia. Over time, some cotton areas would switch to maize.

Diagram EXEC 7: Gross Margins with Full Decoupling in Spain



Source: LMC estimates

Diagram EXEC 8: Cotton vis-à-vis Competing Crops, Full Decoupling, Greece



Source: LMC estimates

OBSERVATIONS

With regard to the reform of the regime and options for change, our analysis suggests:

- The outcome of the reform, at least in the short run, has been markedly different in Greece and Spain. In Spain the area under cotton has contracted while in Greece it has been maintained. There are a number of reasons that account for the inertia in the Greek industry. While our analysis is based on just one year's observations, in the longer term, we would expect to see the cotton area in Greece contract, in view of the higher gross margins for competing crops.
- The speed with which farmers switch between crops depends upon the gross margin, which is a function of both prices and costs. Our analysis is based on the prices that faced producers on planting in 2006. Over time, prices change. For instance, a rise in cereal prices relative to cotton (such as occurred between the time when planting decisions were being made for the 2006 and 2007 crops) would push gross margins further in favour of cereal production and the cotton area would be expected to contract.
- Under a fully decoupled system where a free market for cotton exists, the gross margin for cotton is negative in all but one case. Growers would be expected to switch to alternative crops and there would be much less cotton production in Europe. The only exception is the case where agri-environmental payments are made in Greece, which maintains a positive gross margin for cotton.
- Under the current system, in effect in 2006, gross margins on cotton are highest when agri-environmental payments are received. This is not the intention of the agri-environmental scheme. It suggests that the level at which these payments are set is too high. This is largely because the level of payment was determined before the reform, a time when gross margins for cotton production were higher.

- At present the scheme is based on the payment of the coupled payment on boll opening rather than harvest. For some producers in Spain, the optimal production decision is to move to a low input-low output system without harvesting. This option has lower costs per hectare and producers face less risk than under the other cotton options.
- The discovery that a low input-low output system without harvesting can be an optimal production response for some producers points to a sub-optimal incentive structure that does not lead to the maintenance of the ginning industry, which is essential to the long term viability of the industry. A system of coupled payments implies that cotton production is a desired objective, yet the payment on boll opening contradicts this view, as there is no requirement to harvest that cotton.
- There is over-capacity in the ginning sector. This existed prior to the adoption of the reform, but has been amplified by the reduction in production following the reform, particularly in Spain. Our calculations of capacity assume that total capacity remains constant, however, in reality, faced with such low levels of utilisation the sector would be expected to contract. In order to ensure the long term viability of the industry, ginning capacity needs to be rationalised. Measures could be considered to ease this transition.