

COTTON IMPACT ASSESSMENT

ANNEXES

ANNEX 1 – LIST OF MEETINGS	2
ANNEX 2 – STAKEHOLDER CONSULTATIONS	5
ANNEX 3 – PRESENTATION OF THE COTTON SECTOR	12
ANNEX 4 – DESCRIPTION OF THE EU COTTON REGIME	29
ANNEX 5 – THE EU COTTON SECTOR	36
ANNEX 6 – COSTS OF PRODUCTION AND GROSS MARGIN	49
ANNEX 7 – ECONOMICS OF THE GINNING INDUSTRY	62
ANNEX 8 – ENVIRONMENTAL IMPACTS	71
ANNEX 9 – COTTON FIBRE QUALITY	75
ANNEX 10 – BUDGET EXPENDITURE	77
ANNEX 11 – ASSESSMENT OF ADMINISTRATIVE COSTS	79
ANNEX 12 – REPLY TO IMPACT ASSESSMENT BOARD	82

ANNEX 1 – LIST OF MEETINGS

Date	Name	Participants
02/06/2006	Cotton Advisory Group	Cotton sector
27/09/2006	COPA/COGECA	Mrs E. Corral Mrs B. Reithmayer
27/10/2006	Management Committee for Natural Fibres	Delegates to the Management Committee
27/10/2006	Cotton Advisory Group	Cotton sector
15/12/2006	Management Committee for Natural Fibres	Delegates to the Management Committee
20/12/2006	Cotton Inter-Service Group No 1	AGRI, BUDG, DEV, EMPL, ENV, OLAF, SG, TRADE
11/01/2007	Consultation with the Legal Service of the Commission	DG AGRI Units H1 + C1
30/01/2007	Management Committee for Natural Fibres	Delegates to the Management Committee
02/02/2007	Interservice Steering Group meeting No 2	AGRI, BUDG, DEV, EMPL, ENV, OLAF, SG, TRADE
02/02/2007	Kick-off meeting socio-economic study	ISG + LMC
20/02/2007	Kick-off meeting environmental study	ISG + Oréade-Brèche
28/02/2007	Management Committee for Natural Fibres	Delegates to the Management Committee
30/03/2007	Management Committee for Natural Fibres	Delegates to the Management Committee
17/04/2007	Meeting with the representatives of Junta de Andalusia	Secretary General + Permanent Representation of Spain + DG AGRI and ISG

27/04/2007	Cotton Advisory Group	Cotton sector + ISG
27/04/2007	LMC presentation of the ginning industry	ISG
24/05/2007	LMC presentation of 2 nd interim report	ISG
24/05/2007	Oréade-Breche presentation of 1 st interim report	ISG
25/05/2007	Management Committee for Natural Fibres	Delegates to the Management Committee
25/05/2007	Workshop organised by DG DEV on development issues, with development NGOs	DEV, AGRI + NGOs
08/06/2007	Presentation about the effects of CAP reform on Greek agriculture by Prof. Stelios Rozakis, Department of Agricultural Economics & Development of the Agricultural University of Athens	DG AGRI + ISG
21/06/2007	LMC presentation of 3 rd interim report	ISG
21/06/2007	Oréade-Breche presentation of 3 rd interim report	ISG
21/06/2007	Workshop organised by DG EMPL on employment issues, with employer and employee representatives	EMPL, AGRI, and COPA-COGECA/EFFAT
03/07/2007	Ad hoc cotton working group of the CAP Advisory Committee	DG AGRI, COPA / COGECA, industry, farmers, trade
10/07/2007	Workshop organised by DG AGRI on environmental issues	Representatives of the Agricultural University of Athens (Professors Giourga and Vlahos) and COPA/COCEGA
11/07/2007	LMC presentation of the final report	ISG
13/07/2007	Presentation and discussion on first draft of the Impact Assessment	ISG

**Commission Directorates General and Services
invited to participate in the Inter-Service Group**

Budget (BUDG)

Development (DEV)

Economic and Financial Affairs (ECFIN)

Employment, Social Affairs and Equal Opportunities (EMPL)

Enterprise and Industry (ENTR)

Environment (ENV)

Eurostat (ESTAT)

European Anti-Fraud Office (OLAF)

Regional Policy (REGIO)

External relations (RELEX)

Secretariat-General (SG)

Legal Service (SJ)

Trade (TRADE)

ANNEX 2 – STAKEHOLDER CONSULTATIONS

Summary of the meetings

A2.1 Regular meetings

On a regular basis the services of the Commission presented the timetable of the two studies concerning the environment and the socio-economics aspects of the cotton sector covering following points:

1. Presentation of the terms of reference of the evaluation study of the environmental and socio-economic impacts of the CAP reform measures of the cotton regime.
2. Informing the steering committee on the launching of an internet consultation concerning economic, environmental, employment, consumers, international trade aspects + request of suggestions
3. Presentation of the current situation of the cotton sector in the EU and the world
4. Presentation of the methodology of the evaluation study concerning the environmental aspects of cotton
5. Presentation of the family of possible options and the progress of the external studies on cotton:
 - production aid option
 - partial decoupling option
 - full decoupling option
6. The Commission expressed its interest to collect information on socio-economic, environmental and employment issues (see seminars)
7. Timing:
 - a. the first draft of the Impact Assessment (before summer break)
 - b. submission of the draft to the Impact Assessment Board
 - c. finalisation of the Impact Assessment
 - d. adoption of the Commission proposal (November 2007).

A2.2 Workshops

The objective of each workshop was to understand the concerns of stakeholders on the reform in the socio-economic, environmental and international (development) issues in order to prepare the impact assessment process.

A2.2.1 DG Development in collaboration with DG Agriculture

On 25 May 2007 DG Development organised a meeting with the development NGOs, during which the Commission's representatives presented the world market of cotton as well as the possible scenarios for the future reform.

Main concerns of the representatives of the interested NGOs included the consequences of the reform on the WTO negotiations. For them the proposed scenario cannot result in a return to practices not advised under the WTO agreement. Another issue concerned the implications of different options on particular stakeholders of the cotton sector (farmers and ginners) – the consequences shall be much more important for the ginners. The participants asked if the agri-environmental aid could be considered as a specific production aid. The Commission's

representative replied that the agro-environmental aid is an additional compensation to a farmer for going beyond the compulsory standards (cross-compliance).

A2.2.2 DG Employment in collaboration with DG Agriculture

On 26 June 2007, DG Employment organised a meeting and social partners from COPA GEOPA and EFFAT, who act as European social partners in the framework of the agriculture social dialogue committee. After a presentation of the main issues of the reform, the social partners were called to shed light on the different policy options linked to the reform.

EFFAT expressed its concern about the restructuring of the European Regions whose cotton activities will be affected and asked for special aids and tools in order to help these European agricultural Regions. COPA GEOPA expressed its concern about employers' activities disappearance, incomes upholding, age structures, possibilities of vocational training while conversion and European funds that should be allocated to balance this situation. The Greek and Spain experts from COPA GEOPA explained the importance of cotton in Greece and raised the issue of competition of this industry and stated that cotton was mainly developed in Andalusia, which is an Objective 1 region, according to FEDER. In Andalusia there has been no alternative for this region and big investments have been made in this activity for years. DG Agriculture recalled that the Court did not question the approach to the reform, which had been agreed by the Council, and that written contributions should be sent to DG Agriculture before the end of July 2007, in order to be taken in to account in the impact assessment.

A2.2.3 DG Agriculture on environmental issues

The objective of this consultative group (10 July 2007) was to give the possibility to debate on the absolute and relative (compared to the other alternative crops) environmental impacts of cotton. Participants were two experts from the Greek WWF – Professors Giourga and Vlahos; Spanish experts accompanied COPA-COGECA and officials from DG Environment and DG Agriculture. The first part consisted of a general presentation of the cotton sector and the environmental aspects of cotton. The second part consisted of a discussion to understand the good and bad practices in cotton cultivation, the environmental opportunities (water use, fertiliser use, pesticide use, rotation, comparison between alternative crops, GMOs).

Main conclusions after a discussion were that:

- when considering maize as an alternative crop to cotton the main constraint will be the water restriction and maize is not necessarily better for environment than cotton. The needs in terms of water for 100 ha of cotton are equal to 70 ha of maize and 30 ha of dry culture;
- water quantity both in Greece and Spain will be the limiting factor in the future for irrigation crops (as producers are not paying the actual water cost currently). Changes may occur in 2009 when the water pricing requirements of the Water Framework Directive will have to be implemented;
- in Thessalia (Greece), farmers are continuing to produce cotton as agri-environmental payments are making it profitable do so;
- Spain has made a lot of effort to introduce integrated production schemes which has improved the environmental performance of the cotton crop (e.g. no more plastic use, limitation of fertilisers under Nitrate Directive).

Also a meeting was attended (6 June) on the concerning the impact of pesticides with PAN (Pesticide Action Network) and EJF (Environmental Justice Foundation) in which they explained the worldwide impact of pesticide use of cotton on environmental and health issues

A2.2.4 Ad hoc Consultative group on Cotton (organised by DG Agriculture)

On 3 July a meeting was organised to give stakeholders the possibility to express their main concerns, priorities and opportunities for the new proposal for the reform of the cotton regime.

A presentation was given as an introduction to the discussion dealing with the following matters, the current situation of the cotton regime (quantity and quality), the international context, the structure of the producers and the ginning industry, the economics of cotton production, the environmental aspects and the different scenarios that will be analysed before a new proposal will be done. The participants were asked to comment on the different scenarios and their impact on cotton production (quantity and quality), processing industry, agriculture at regional level, employment and environmental issues.

Main conclusions were:

- certain levels of cotton production should be maintained, as this is an obligation that forms part of the accession Protocols of Spain and Greece;
- the cotton industry plays an important role as it forms the primary production in areas where there is a high concentration of cotton production (e.g. Thessalia);
- the quality of cotton was a main concern of the members present, as under the current reform the coupled payment is based on the opening of bolls. A possible solution is the obligation to harvest which would involve a higher supply to the ginning industry;
- the environmental issues play an important role and the environmental impact can be reduced through alternative practises and agri-environmental practises (integrated production). Concerning the alternative crops: growing cotton uses less irrigation water than maize, but differences in terms of pesticides and other environmental damaging aspects should be analysed in detail;
- the cotton sector may have to consider product differentiation creating a niche-market compared to the world market (e.g. high quality cotton). Traders and the representatives of the industry underlined the interest to promote the EU quality cotton;
- an aid for restructuring the industry should be considered, as ginning plants are closing and under the new regime the production may decline to a lower level;
- EFFAT raised the fact that a loss employment in the cotton sector is bound to happen.

A2.3. Public consultation: Executive summary of the internet consultation

As part of a general stakeholder consultation the aim of this public internet consultation was to collect contributions from a broad range of individuals and organisations that are interested in the EU's cotton policy.

Important limitations in interpretation of the results include the nature of public consultations of this type. Respondents had to be aware of the ongoing consultation, had to have internet access, answers were anonymously (background of the respondent cannot be checked), misunderstanding of questions on complex issues, over-representation of some stakeholders groups. However the latter problem can be overcome if the stakeholders are dealt with

separately instead of together. In view of the above cited limitations, this report does avoid over-interpreting the results in the utmost details.

This document is one of the many documents stemming from the stakeholder consultation process for cotton. The aim of this document is to understand the main tendencies and concerns of each stakeholder category. Also it is important to note that quality of the answers was good and rational according the stakeholder group and has helped the Commission services to understand the priorities of each stakeholder group.

Six stakeholder groups were differentiated farmers, the cotton industry, consumers, experts, government and NGOs. However not all were equally represented. One third of the total respondents were farmers. The cotton industry, experts and the consumers were also well represented (16–18% for each category). In terms of geographical background responses mainly came from Greece and Spain, the main cotton growing areas.

Economic issues prevail as the main point of concern of all stakeholders is the payment scheme. About half of the respondents agree with decoupling. It is mainly the ginning industry that most favours coupling, while experts, government and NGOs are mostly in favour of decoupling (mainly partial, but some also full). About half of the farmers are in favour of completely coupled aid and the other half are in favour of decoupling (mainly partially, but some also fully). In the reform all stakeholder categories (except for the industry) think that the support should go to farmers.

The cotton industry proposes support to both cotton farmers and the industry. Simplification does not seem to be a main concern for most stakeholders. The majority of the respondents responded positively to support cotton, although the NGOs were less in favour. The main priorities among all respondents (except the industry) are keeping environmental friendly production techniques. Also quality concerns were an important priority for different categories (farmers, the industry, consumers and NGOs).

The main environmental problems revealed by all stakeholders are water consumption and pollution. Stakeholders commented that maize and sugar (the main quoted alternatives) use even more water and fertilisers. Main solutions for environmental problems are the use of sustainable farming techniques with fewer inputs. Consumer and quality issues indicate that there is favourable tendency to support high quality cotton but among all stakeholders opinions are mixed whether support should only be limited to these segments of the sector.

From a global point of view all respondents were positive about the future of the demand for cotton. On international issues, farmers and the industry are in favour of maintaining the EU's current 2% share of world production, while NGOs, experts, consumers and government recognise that EU cotton support has a negative impact on developing countries, or believe that the EU should help support African cotton-producing countries.

Social concerns of this consultation highlight the importance of cotton cultivation for the economies of the regions concerned. Many stakeholders fear unemployment and rural exodus if the cotton reform is too drastic. Main alternative options cited are maize and to a lesser extent durum wheat. All stakeholders are in favour of using rural development programmes in cotton areas to improve the quality of cotton and all are in favour of agri-environmental measures (except for the ginning industry).

A2.4. Specific meetings

A2.4.1 Representatives of the Andalusian government

On 17 April 2007 a meeting with representatives of the Junta de Andalucía and the Commission representatives from DG ECFIN, OLAF, DG AGRI C1, D1, Directorate G, G1 was organised. Teresa Saez (Secretary General of Agriculture and Rural Development, Junta de Andalucía) presented the situation of cotton in Spain, the impact of the 2004 reform and the Andalusian proposal for a future reform of the cotton sector.

The Government of Andalusia pointed out that the Judgement of the European Court of Justice was positive because no impact assessment was made in the concerned municipalities, no account had been taken of the decoupled payment on calculating the profitability of cotton, no account had been taken of wages and no impact study had been done on the ginning industry. Two studies (socio-economic and environmental) were made by the government de Andalucía which were presented at the occasion of this meeting.

In a first part the characteristics of cotton agri-business in the Andalusian economy in a pre-reform setting were presented. Cotton agri-business represents 25% of the total employment, 10% of GGP, 90 000 ha of irrigated land, 10 000 farmers (80% family farmers) and 25 ginning plants. There is a complex agro-industrial system associated to the cultivation of cotton (seeds, inputs, machinery), concentrated in the very same area where other reforms are currently being implemented: sugar beet, processed tomatoes.

According to the government of Andalusia the impact of the reform for 2006/07 campaign with respect to 2005/06 involved a 24.8% reduction in crop area (to 62 000 ha), a 45% reduction in yields, the disappearance of the crop in the region of Murcia, 2 000 farmers (about 20%) that abandoned the crop.

The impact on the ginning industry was the following: 5 out of the 25 ginning industries stopped their activity, a decrease of 60% in processed raw material, a quality decrease due to the increasing use of stripper harvester, an increase in fixed costs, a 38% decrease in employment due to less work shifts, smaller campaign length, less temporary employment.

What the Andalusian government is proposing is not to change from the philosophy of the 2003 reform, but to impose a period of adaptation in order to adopt adequate measures for the Region. The Member States should be able to differentiate the coupled aid based on non discriminating specific objectives, like yields or quality, etcetera. The coupled part should involve 70 000 ha in Spain. The following arguments were raised to propose the decoupled part of payment should no be higher than 20%:

- based on the profitability of cotton, with 65% decoupling is negative (based on Andalusian government calculations);
- 46 000 ha is under integrated production, which requires less use of plastic (about 5 tonnes of plastic less than traditional production) and less phyto-sanitary treatment. The agri-environmental aid reaches 60 000 ha of cotton and concerns a payment of €350/ha which is given for integrated production is low and lasts only five years (current regime will be valid until 2013);
- the traditional crop does not involve any obligation to harvest; consequently farmers cultivate the crop until the opening of bolls, wasting irrigation water and energy;

- concerns were noted on the massive move from cotton to other crops, which could translate the problem into other sectors. The region is currently already undergoing effects of implementing the sugar reform;
- in order to allow the whole chain to adapt, it is necessary that the restructuring and/or diversification of the ginning industry (measures like the ones implemented with the sugar reform would be preferred).

A2.4.2 Meeting with Greek Agricultural Economic experts

Prof. Rozakis (Department of Agricultural Economics and Development, University of Athens) was invited to present his work on the "new CAP impacts to cotton growers in Greece". The sample was based on 987 farms cultivating at least 0.1 ha of cotton and the methodology used was mathematical programming. According to the model, the main current results are that a decrease in cotton cultivated area of about 30 percent is to be expected (mainly in Thessaly (41%) and Macedonia-Thrace (37%)). Durum wheat decreases overall (25%) due to dramatic decrease in Macedonia-Thrace and secondly in Sterea. Durum wheat is expected to increase also in Thessaly. It may be replaced by soft wheat (especially in Northern Greece). Alfalfa is considerably increasing (55%) mainly cultivated in Macedonia-Thrace (threefold) and secondly in Thessaly (149%). Maize doubles its acreage. Not harvested cotton is extensively cultivated in Macedonia-Thrace aiming at the coupled subsidy reserved to cotton. Further investigation with regard to slippage or abandonment of activities is still needed.

A2.4. Parliamentarian questions received and 4 letters received from COPA, the Greek ginning association and the Spanish ginners

The notes were answered and considered in establishing a view of the stakeholders.

A2.5. General Conclusions

All stakeholders have had a fair possibility to express their concerns at different moments (January 2007–July 2007), through different contributions (specific meetings, workshops, public consultation, letter and questions) and on different topics (regional, international, development, employment, social, environmental, consumer, quality issues):

It is clear that the current 2004 cotton reform has implied many stakeholders to react as this has had socio-economic and environmental implications in the regions concerned.

From a socio-economic stakeholder's point of view, the employment loss and the possible restructuring of the ginning industry must not be neglected. Stakeholders expressed the needs for special tools and a period for adaptation to help adapt to a possible new regime. The strong regional dependence on cotton in some areas should also be considered. Also very important to consider is that maintaining cotton production is part of the Adhesion Protocol No 4 of Greece

When stakeholders with environmental interests were consulted, it can be noted that although Member states may have done efforts to cotton production in Spain and Greece, the intensive cotton production does have a strong environmental impact in terms of water use and quality and other inputs. Also the impact assessment should consider the environmental impacts of alternative crops, as in some cases these may replace the current cotton production. Finally, the 2003 CAP reform emphasises the importance of cross-compliance measures.

Development and international players highlighted clearly that a proposal should be in line with a strong negotiation position at the WTO and the EU commitments to the least developed countries. At several occasions the conditions of coupled aid in terms an obligation to harvest versus a boll opening were highlighted.

It is clear that a new reform must take into account the stakeholders involved and provide measures for the ones that may be an unfavourable position.

Annex 3 – Presentation of the cotton sector



EU Cotton sector



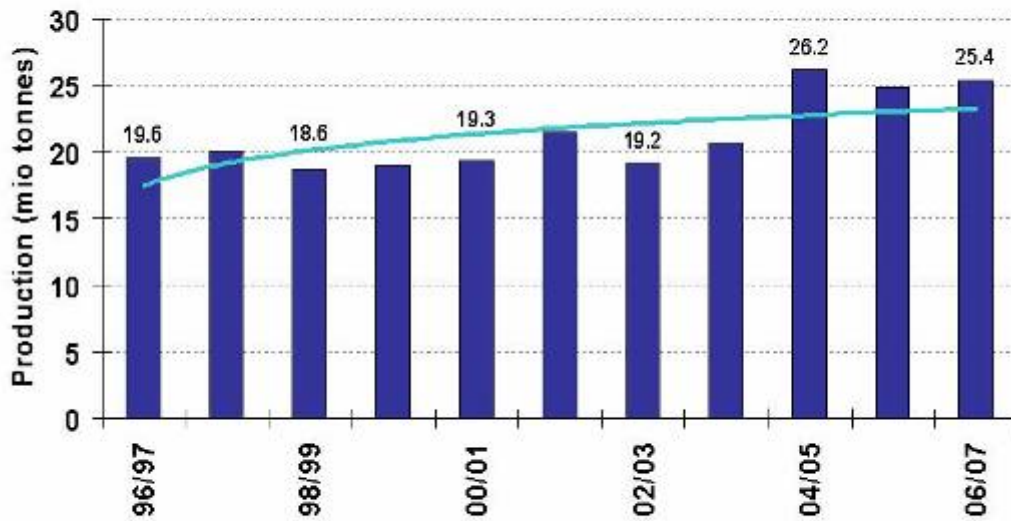
Contents



- **Global Market**
- **Cotton in the EU**
- **The EU Cotton Regime**
- **International context (WTO)+ balance**
- **Structure of producers and ginning industry**
- **Economics of production**



World production of ginned cotton has grown by 6% per annum over last five years



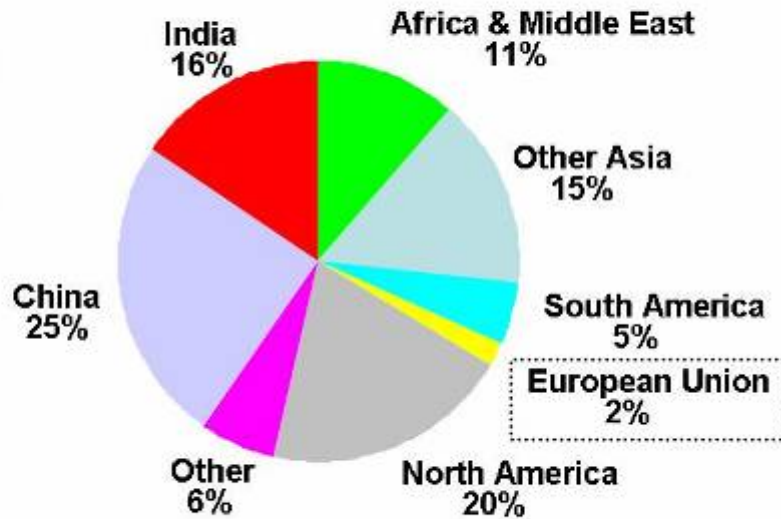
3



Production is dominated by China, India and US



The share of EU is by 2% (02/03-06/07)



4



Cotton in EU

5



EU Cotton Area



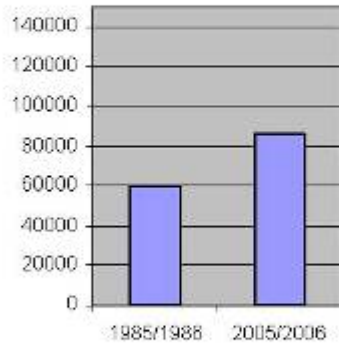
6



Spain: Cotton Production & Area (2005/06 vs 1985/1986)

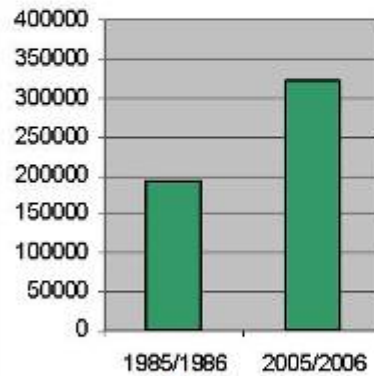


Spain Cotton Area (ha)



↑
Accession

Spain Unginned cotton Production (ton)



↑
Accession

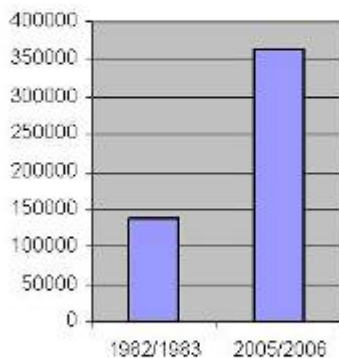
7



Greece: Cotton Production & Area (2005/06 vs 1982/1983)

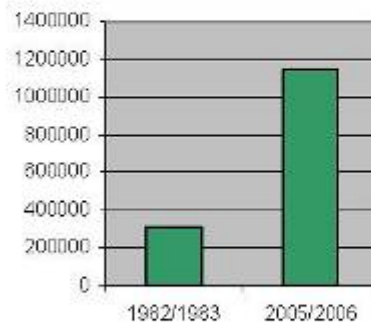


Greece Cotton Area (ha)



↑
Accession

Greece Unginned cotton Production (ton)

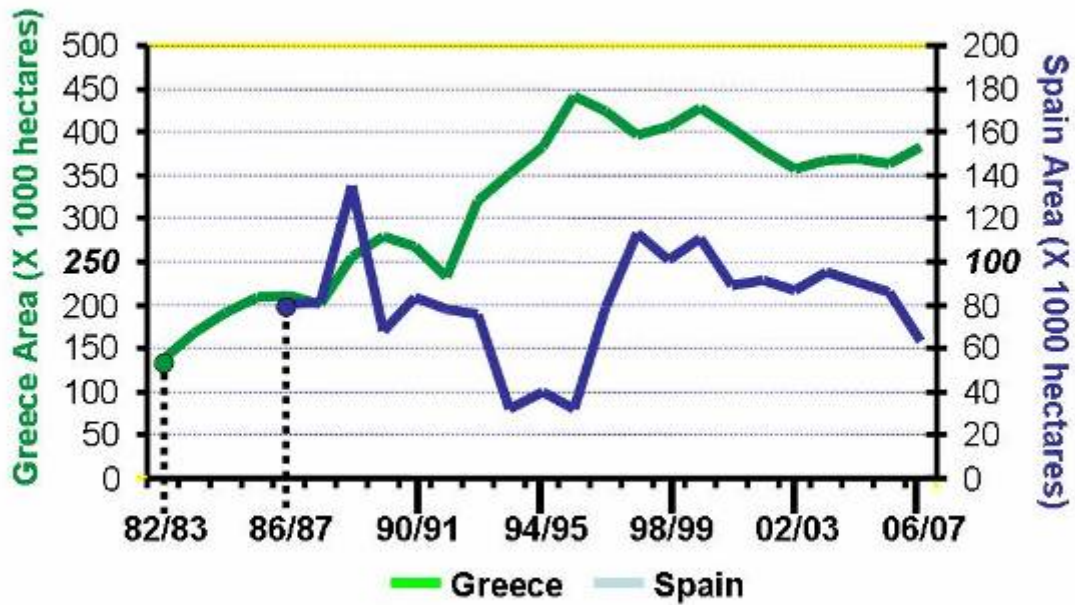


↑
Accession

8



EU Cotton Area by Member States



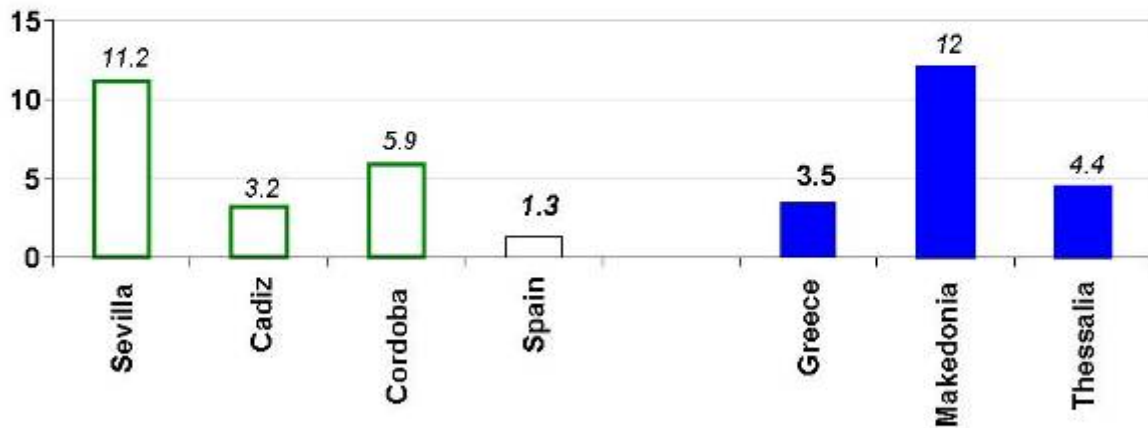
9



Relevance of cotton sector in Spain and Greece agriculture output



Cotton as % of total agricultural output (2003/05)



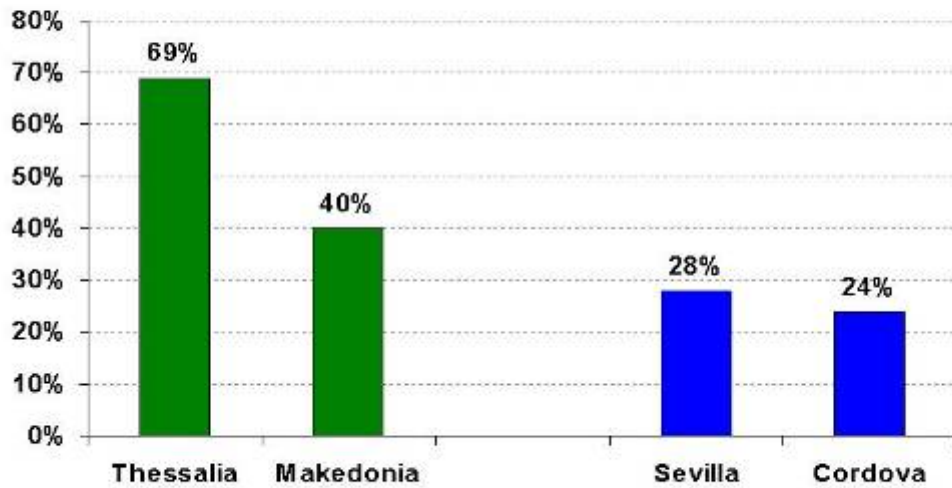
10



Relevance of cotton sector in Spain and Greece agriculture area



Share of holdings where cotton area accounts for 50% or more of the total farm area (2003/05)



11



EU cotton regime

12



Principles of EU Cotton Regime Prior to 2006



- Producers received minimum per tonne price
- Aid was based on difference between guide price and world price
- If production exceeded reference level, a stabiliser mechanism reduced guide and minimum price
- The Aid was paid to the ginners

13



2006 Reforms

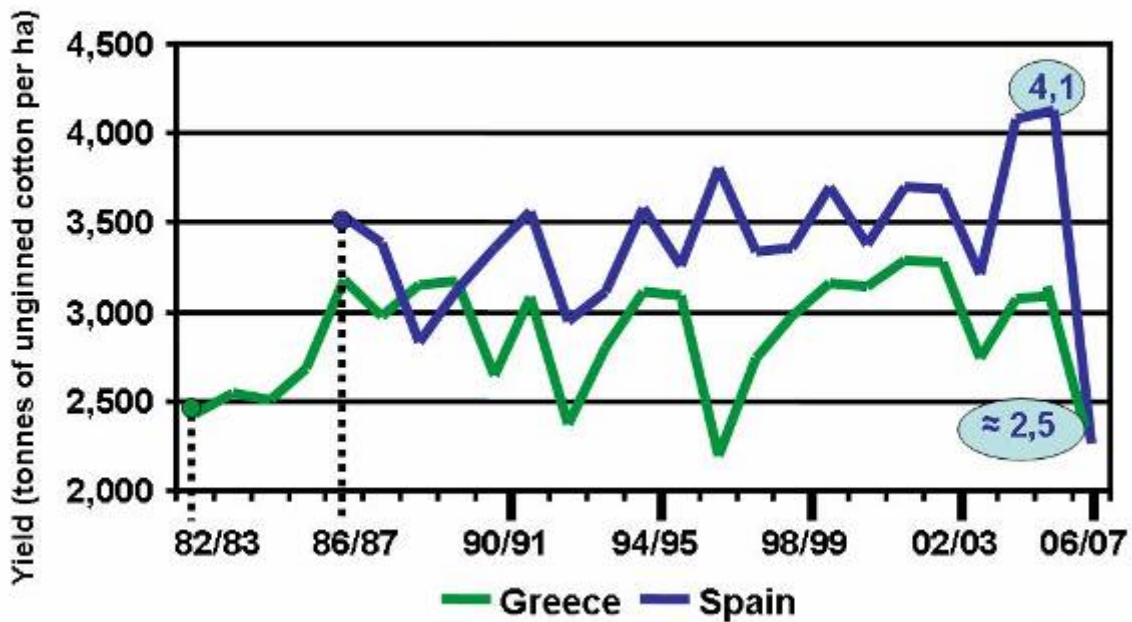


- Aid on a per hectare basis
- Partly decoupled
- Coupled aid:
 - Greece: €594 per hectare for 300,000 ha €342.85 for 70,000 ha;
 - Spain: €1,039 per hectare (for 70.000 ha);
 - Portugal: €556 per hectare
- Aid payable on the opening of the bolls (not harvest).
- Payments were made directly to the farmers

14



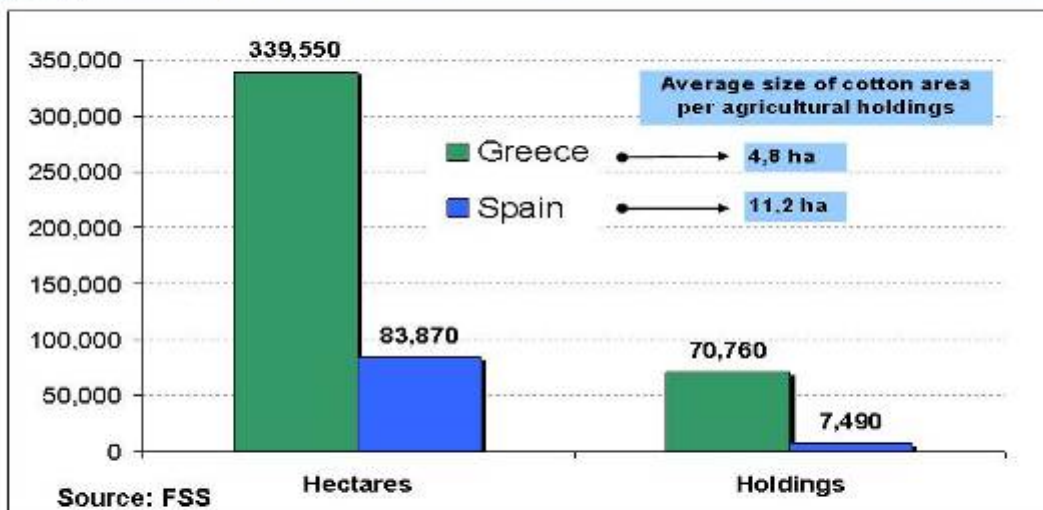
3. EU Cotton Yields, Unginned cotton



15



Holdings and Area in Greece and Spain (2005)

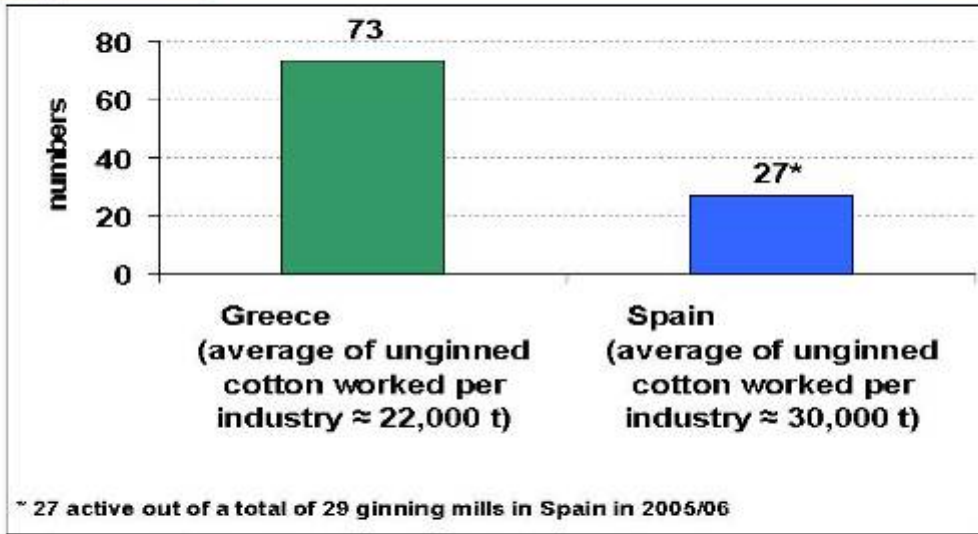


Greece (total hectares and number of holdings) >> Spain
 Spain (average size) >> Greece

16



Ginning industry (2005/06)



Greece >> Spain

17



Average Variable Costs for Cotton (2003 – 2004)



Source: LMC

In Spain variable costs for cotton production are ≈ 45% higher than in Greece

18



Potential environmental effects of cotton production



- **The use of high amount of phytosanitary products is needed to maximize the yield**
 - Pesticides/herbicides/insecticides (*environmental toxicity problems*)
 - Defoliants
- **Fertilizer (560 kg of NPK per hectare)**
- **Irrigation** —→ **water use in the cotton sector is around 5.500 m³ of water per hectare (*100% of land used for cotton is irrigated*)**
- **Rotation** —→ **monoculture and degraded land (*acidification/biodiversity*)**

19



Other environmental aspects



- **Input use**
- **Alternative Crops**
- **Agricultural practises**
- **Production with a lower environmental impact**

20



Spain: evolution of input use in cotton sector (2000-2005)



Farm Size		Fertilizers	Pesticides	Herbicides	irrigation
<10ha	No Change	100%	100%	100%	100%
10-20ha	No Change	75%	83%	92%	92%
	< 25% decrease	17%	8%	0%	0%
	25% - 50% decrease	8%	8%	8%	8%
	< 25% increase	5%	8%	5%	5%
>20ha	No Change	95%	87%	95%	95%
	< 25% decrease	0%	5%	0%	0%

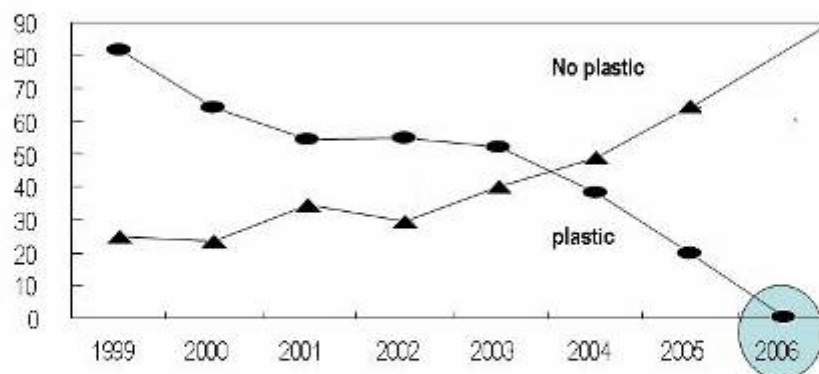
Between 2000 and 2005 the evolution of input use has been not significant:

- < 10 ha → 100% of holdings with no changes
- 10 – 20 ha → 75~92% of holdings with no changes
- > 20 ha → 87~95% of holdings with no changes

21



Spain: evolution of plastic cover (1999-2006)



Between 2000 and 2006 the utilization of plastic films in the cotton sector has strongly decreased.

22



Greece: evolution of input use in cotton sector in agricultural holdings (2000-2005)



	Fertilizers (kg/ha)	Pesticides, insecticides and fungicides (kg/ha)	Herbicides (kg/ha)	Irrigation (m ³ /ha)
Increase >50%	1,11%	0,56%	0,56%	2,30%
Increase 25% to 50%	32,22%	21,23%	21,11%	14,37%
Increase <25%	15,00%	27,93%	27,22%	14,94%
no changes	28,89%	36,31%	42,78%	59,20%
Decrease <25%	14,44%	11,73%	6,67%	6,32%
Decrease 25% to 50%	8,33%	2,23%	1,67%	2,87%
Decrease >50%	0,00%	0,00%	0,00%	0,57%

Summary	}	Holdings having,	no changes (%)	increase
		▪ fertilizers →	29	32
		▪ pesticides →	36	28
		▪ herbicides →	43	27
		▪ irrigation →	59	15

23



Spain: cotton and alternative crops between 1999 - 2003



Year	Area (X 1000 ha)			
	Cotton ↓	Maize ↑	Durum wheat ↑	Soft wheat
1999	104.9	15.6	3.6	12.6
2000	84.3	8.3	3.2	13.3
2001	85	25.8	4.7	12.8
2002	82.1	28.2	6.2	14.7
2003	88.6	31.8	6	13

The evolution of the land use in the holdings cultivating cotton showed, between 1999 and 2003:

- » Reduction of cotton area
- » Increase of area of maize and (slightly) durum wheat
- » Status quo for soft wheat

24



Greece - Thessalia area: cotton and alternative crops between 1999 – 2005



Year	Cotton ↓	Malze ↑	Wheat ↓	Tobacco	Grassland and fodder ↑
1999	172 676	23 080	179 643	6 494	26 696
2000	160 547	25 222	143 885	5 578	28 284
2001	155 175	24 980	147 103	5 660	NA
2002	150 925	27 868	146 123	5 401	28 718
2003	149 197	30 083	144 895	5 674	30 777
2004	151 406	29 801	143 533	5 515	31 608
2005	149 495	31 674	138 928	4 448	32 157

The evolution of the land use in the holdings cultivating cotton showed, between 1999 and 2005:

- » *Reduction of area of cotton, wheat and tobacco*
- » *Increase of area of malze, grassland and fodder*

25



Cotton and alternative crops



Growing cotton is a more problematic cultivation than some other crops, like winter cereals and sunflower, mainly because of:

- Use of water;
- Intensive use of inputs;
- Rotation (mono-cultivation)

26



Spain: agricultural practices between 2000 - 2005



- reduction of cotton area;
- abandonment of plastic cover utilization and better management of waste;
- compulsory rotation for holdings bigger than 10 ha;
 - Rotation in the holdings > 10ha (60% of cotton area and 18% of holdings in 2003/04)
- Reduction in water used (*change to drip irrigation, better management of water but higher costs of irrigation water*);
- Slight reduction in usage of inputs.*

27



Greece: agricultural practices between 2000 - 2005



- No changes or slight increase in the use of phytosanitary inputs;
- compulsory rotation for cotton area (?);
- cotton, as one crop, is high intensive in Thessalia region (where water irrigation is very problematic);
- programs in accordance with the Nitrate Directive have been applied in vulnerable areas;

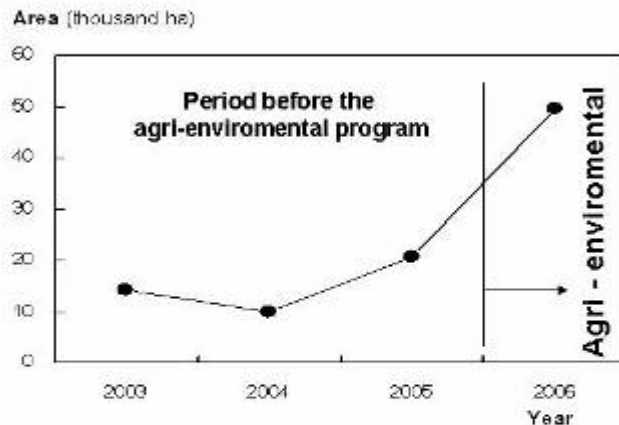
28



Spain: evolution of cotton area under agri-environmental program



- Amount of aid = 350 €/ha



- Compensation for:
 - reduction of yield
 - higher production costs
 - monitoring of the scheme adopted (soil analysis, technical support, etc)

29



Greece: evolution of cotton area under agri-environmental program



- Amount of aid = 532-600 €/ha (92.000ha eligible for aid in Thessalia, i.e. 25% of total cotton area in Greece);
- Compensation for decreasing income due to:
 - compulsory set aside by 25%;
 - reduction in using N by 20%
 - crop rotation by 25% of the irrigated crops with dry crops
 - monitoring of the scheme adopted (soil analysis, technical support, etc)

30



Spain: return following the reform to the cotton regime



European Commission
Agriculture and Rural Development

SPAIN	Cotton ²		Durum Wheat	Maize with 25% coupled	Sunflower
	Medium yield				
	With AE	No AE			
Price (€/t)	244	244	139	129	233
Yield (t/ha)	2.6	2.6	3.4	12.3	2.0
Coupled payment (€/ha)	1,039	1,039	60	115	60
Agro-environment payment (€/ha)	350				
Supplementary payment (€/ha)	191	191	71		
Quality premium (€/ha)			40		
Total Revenue (€/ha)	2,206	1,856	644	1,698	526
Variable Costs (excl unpaid labour)	1,328	1,328	346	1,185	317
Gross Margin (€/ha)	878	528	298	513	209
Unpaid labour (hrs)	153	153	134	103	60
Return to unpaid labour (€/hr)	5.7	3.5	2.2	5.0	3.5

SP = Supplementary Payment, Art.69 of Reg. 1782/2003

AE = Agro-Environmental Payment

Prices of maize and durum wheat: average price of the past three years

(*) With Supplementary Payment

31



Greece (Mekedonia-Thraki): return following the reform to the cotton regime



European Commission
Agriculture and Rural Development

MAKEDONIA-THRAKI	Cotton	Durum Wheat	Maize
	Normal yield		
Price (€/t)	317	147	143
Yield (t/ha)	3.1	2.6	11.8
Coupled payment (€/ha)	529	0	0
Agro-environment payment (€/ha)	0	0	0
Supplementary payment (€/ha)	0	0	0
Quality premium (€/ha)		40	
Total Revenue (€/ha)	1,511	421	1,690
Variable Costs (excl unpaid labour)	1,188	381	1,013
Gross Margin (€/ha)	323	40	677
Unpaid labour (hrs)	195	79	194
Return to unpaid labour (€/hr)	1.7	0.5	3.5

32



Greece (Thessalia-Thraki): return following the reform to the cotton regime



THESSALIA-STEREA	Cotton		Durum Wheat	Maize
	No AE	With AE		
Price (€/t)	309	309	147	143
Yield (t/ha)	3.4	2.5	3.9	11.6
Coupled payment (€/ha)	529	529	0	0
Agro-environment payment (€/ha)	0	542	0	0
Supplementary payment (€/ha)	0	0	0	0
Quality premium (€/ha)			40	
Total Revenue (€/ha)	1,567	1,843	611	1,661
Variable Costs (excl unpaid labour)	1,177	1,127	429	1,049
Gross Margin (€/ha)	390	716	182	612
Unpaid labour (hrs)	220	230	98	194
Return to unpaid labour (€/hr)	1.8	3.1	1.9	3.2

AE = Agro-Environmental Payment

Prices of maize and durum wheat: average price of the past three years

33



Concluding remarks on the impact of the 2004 regime



- The impact of the 2004 regime has been different in Greece and Spain
- In Greece, there was little change in the cotton area: yield sensitive to weather conditions
- In Spain, both area and yields have fallen
- In Spain, farmers have moved to a lower input / lower output production model
- Agro-environmental payments are important determinants of both margins and profitability

34

ANNEX 4 – DESCRIPTION OF THE EU COTTON REGIME

The EU cotton regime was introduced in 1981 with the accession of Greece into the European Community and expanded with the accession of Spain and Portugal in 1986. Until the reforms of 2004 (which were first implemented in 2006), the main principles of the regime remained largely unchanged, although the scheme was revised six times.

Protocol 4 established a 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.”

Paragraph 3 of Protocol No 4 provided that such a system ‘shall include the grant of an aid to production’, while paragraph 11 of Protocol No 4, in its original version, both required the Council to review the operation of the support system for cotton and provided it with the *vires* to modify that system. It was on the basis of that paragraph that the Council modified the system since its original adoption.

A4.1 The Regime prior to 2006

Basic Principles of the Regime

The basic principles of the regime were that:

- producers received a minimum per tonne price for unginned cotton;
- this price comprised an unginned cotton price derived from the world market price plus a payment from the EC;
- the payment from the EC was made to the ginners, who then paid the growers.
- the level of payment from the EC was based on the difference between a “guide” price that was fixed by the Council and the world market price;
- growers received a minimum price, which was computed as the guide price minus a permitted administrative cost which was claimed by the ginners;
- the guide price protected growers from fluctuations in the world price, but allowed the ginners to sell cotton fibre at prevailing world market prices;
- when cotton production exceeded certain reference levels, a stabiliser mechanism was enacted which reduced the guide and minimum prices with a view towards reducing grower prices and hence over-production.

A4.2 1981 – 1985

Under the original scheme¹, the guide price was set annually by the Council and the world market price for unginced cotton was determined by the Commission. In the latter case, where price quotations were not available for unginced cotton, the world price was determined from the value of products obtained from ginning and estimated ginning costs.

Ginners applied for aid from the national authorities no later than the day on which the product entered their undertaking. To allow forward contracts to be negotiated, applications could be made before the product was physically available.

The minimum payment was based on a standard quality unginced cotton which was defined on the basis of its impurity and moisture contents, length and grade of fibres.

The guide price was limited to a maximum guaranteed quantity (MGQ) which the Council set. If production exceeded the MGQ, a stabiliser mechanism reduced the price actually paid to the growers and the aid they received. If the estimated production before the start of the cotton year was greater than the MGQ, the guide price was reduced by 1% for every 15 000 tonnes by which the MGQ was exceeded. In practice, the MGQ was set at 560 000 tonnes and was never exceeded.

A4.3 1986 – 1991

With the accession of Spain and Portugal, among whom only Spain was then a producing country, the MGQ was increased to 752 000 tonnes with effect from the 1986/87 cotton year. In 1987/88², to protect growers from a large fall in the minimum price (due to production exceeding the MGQ), a cut-off point was introduced below which the guide price could not be reduced. The cut off was initially set at 15% below the guide price, but later the maximum price reduction was raised to 25%.

There were a number of limitations to the scheme:

- production always exceeded the MGQ between 1986 and 1991;
- although the MGQ was set at 752 000 tonnes, it could be adjusted on the basis of the gap found between actual production and estimated production for the preceding year. Consequently, and despite the operation of a cut off point, the reduction in the guide price fluctuated between 6% and 25% each year;
- the quality of cotton produced in the Community was below the standard that formed the basis of the regime's measures determining prices. This was because the regulations did not take account of organic impurities and so producers had little incentive to produce clean cotton; and
- as aid was payable no later than the day in which the cotton was lodged, this meant that if ginners were unable to sell or hedge that cotton immediately, they were subject to the full risk inherent in fluctuating world prices.

¹ Council Regulation (EC) No 2169/81.

² Council Regulation (EC) No 1964/87.

Under Regulation (EEC) No 1152/90 a system of aid for small producers (whose area did not exceed 2.5 hectares) was established. Its purpose was to compensate these producers for the falls in income brought about by the stabiliser mechanism. The aid was set at a level to compensate for the costs involved in hand picking cotton (this aid amounted to ECU 250 per hectare, but the area eligible for payments was limited to 73 000 hectares in order to ensure budget stability). When the area under cotton, exceeded this amount, the aid was reduced in proportion to the extent of the overrun.

A4.4 1992 – 1995

In light of the limitations noted above, the operation of the regime was adapted³:

1. annual fixing of the MGQ was abandoned in order to reduce uncertainty at sowing time;
2. the MGQ was no longer adjusted on the basis of the gap between actual and estimated production in the preceding year;
3. the 15 000 tonne tranches for establishing the reduction in the guide price were replaced by a coefficient that was calculated using the overrun on the MGQ;
4. any reduction in the guide price, when actual production was higher than the MGQ, was limited to 20%. However, if the fall in the guide price should have been greater than 20%, any excess was carried over and thus served to reduce the guide price in the next cotton year. This was known as the “cut-off and carry over system”;
5. the standard quality of unginned cotton was adjusted to take account of organic impurities;
6. aid applications from ginnerers could now be lodged after the day in which delivery was made to the ginner.

Production continued to exceed the MGQ and guide price reductions were enacted. An objection that was made to the revised regime was that the uniform reduction in the guide price was felt to be unfair to Spanish growers whose production, in part due to drought, had not expanded, while Greek production continued to expand.

A further criticism of the measures was that the operation of the scheme for small producers led to a change in the production structure and an increase in the number of small farms.

A4.5 1995 – 2000

The regime was further revised in June 1995⁴. On the basis of the EU’s internal demand for cotton fibre and taking account of the areas judged suitable for production, the MGQ was increased. At the same time, to ensure budget neutrality, the guide and minimum prices were reduced.

The MGQ was increased to 1 031 000 tonnes and, to ensure fairness between member states, a National Guaranteed Quantity (NGQ) was introduced for each producing country. If national production exceeded the NGQ then the aid was reduced proportionately in the country

³ Council Regulation (EEC) No 2052/92.

⁴ Council Regulations (EC) No 1553/95 and (EC) No 1554/95.

responsible for the excess. The NGQ was set at 782 000 tonnes for Greece and 249 000 tonnes for Spain. Other countries with cotton potential were permitted a quota of 1 500 tonnes.

Under the stabiliser mechanism, the price fell by 0.5% for every 1% by which actual production exceeded the NGQ. However, aid to the sector was required to be at least €770 million in magnitude. In the event of high international prices, when the level of aid per tonne was reduced, the reductions in guide price were moderated to ensure that the minimum level of budgetary expenditure was reached.

The guide price was set at €1 063.0 per tonne of unginned cotton and the minimum price at €1 009.9 per tonne. The required quality standards were that the cotton was:

- of fair sound and merchantable quality;
- having 10% moisture and a 3% impurity content;
- having the necessary characteristics to produce, after ginning, 32% grade 5 fibres (white middling) of 28 mm length (1-3/32 inches).

The world market price for unginned cotton was determined by the Commission on the basis of the historical relationship between the world market price for ginned cotton and the calculated price for unginned cotton, rather than an estimate of production costs.

The world market price was based on the above quality standards, and an average of offers and quotes made at one or more European exchanges for a product delivered c.i.f. Northern Europe. The Cotlook “A” cotton price acted as a proxy for this price.

Under the revised scheme, the cut-off and carry over system was abolished. Aid was received when the cotton was ginned, but advance payments could be made when the unginned cotton entered the ginner’s undertaking, subject to the provision of adequate security by the ginner. The advance could not exceed 40% of the guide price. The balance was paid on ginning and before the end of the marketing year.

The scheme for small producers (Regulation (EEC) No 1152/90) was repealed.

Over the period production continued to be, on average, above the NGQ in both Spain and Greece and in 1999/2000, with low prices, budget expenditure rose to record levels. Portugal began cotton farming in 1997/98 and all its unginned cotton was processed by Spanish ginners.

A4.6 2001 – 2005

A sixth amendment of the scheme was introduced in May 2001⁵. The regulation sought to simplify the system as the legislative arrangements were considered too complex. Consequently, paragraph 11 of Protocol 4 was repealed and replaced by an enabling provision (now paragraph 6 of Protocol 4). The paragraph stated that ‘the Council, acting by a qualified majority on a proposal from the Commission and after consulting the European Parliament, shall decide on the adjustments necessary to the system introduced pursuant to this Protocol and shall adopt the general rules necessary for implementing the provisions of this Protocol’.

⁵ Council Regulation (EC) No 1050/2001.

At the same time, and on the basis of the new paragraph 6, Council Regulation (EC) No 1051/2001 was adopted. Under the regulation:

1. The guide price and minimum prices were maintained at their previous levels. The NGQ was maintained at 782 000 tonnes for Greece and 249 000 tonnes for Spain and 1 500 tonnes for other member states. However, further penalties were introduced if total Community production rose above 1 500 000 tonnes (Table A4.1).

Table A4.1: Revised NGQ and Enforced Penalties, 2001 – 2005

	NGQ '000 tonnes	1st penalty	Second NGQ '000 tonnes	2nd penalty
Greece	782	Guide price reduction of 50% of the % rate of overshoot	1.138	Additional 2% penalty on the guide price reduction for each 15 170 tonnes above the second NGQ
Spain	249	Guide price reduction of 50% of the % rate of overshoot	362	Additional 2% penalty on the guide price reduction for each 4 830 tonnes above the second NGQ

Source: DG AGRI.

The level of aid to the sector was still required to be at least €770 million and, in the case of high international prices when the level of aid per tonne was lower, the reductions in fixed prices were moderated to ensure the minimum level of expenditure.

2. The means for calculating the market price for unginning cotton was set out in a formula. The price was recalculated three times each month.
3. The rules for advance payment were revised so that an advance could be made, subject to the necessary securities being in place, when unginning cotton entered the ginners' "supervised storage" system. The advance could then be made for the full value of the aid.
4. Under the revised scheme, for the first time, member states were required to consider environmental issues in the granting of the aid. The Member States were required to:
 - determine measures to improve the environment, paying particular attention to cultivation techniques; and
 - develop research programmes into more environmentally friendly grower measures and inform growers of the results of such research.

In addition, MS could restrict the areas eligible for production aid on the basis of objective criteria relating to:

- the agricultural economy where cotton was the major crop;
- the soil and climatic conditions in the region concerned;
- the management of irrigation water and rotation systems and cultivation methods likely

to improve the environment.

In Spain, this meant that from 2002/03 a system of compulsory crop rotation was introduced at farm level, while in Greece a national decree limiting the production area eligible for aid was introduced. This eligible area was set at 393 700 hectares (a 5% reduction on the average area in previous years).

A4.7 The basic principles of the new regime

In 2003, the Mid-Term review of the Agenda 2000 reform, provided a far-reaching general reform of the CAP. The guiding principle was a move away from price and production support for specific crops to one of direct support for farmers' incomes. Regulation (EC) No 1782/2003 implemented the CAP reform and, from October 2003, subject to transition arrangements that were determined by individual Member States, most aid to farmers under the CAP became 'decoupled': that is, farmers receive a single farm payment not linked to the production of a specific crop.

To bring the support schemes for cotton, olive oil, tobacco and hops into line with those of other sectors of the Common Agricultural Policy, the Council adopted Regulation (EC) No 864/2004. For these crops however, a proportion of the aid remained coupled⁶ (i.e., linked to production of the crop). For cotton, the justification for this coupled payment was that the adoption of a completely integrated single farm payment scheme would bring significant risk of production disruption to cotton producing regions. Consequently the decoupled single area payment was set at 65% of the national share of aid available to producers and the remaining 35% remained coupled to cotton but calculated on the basis of a per hectare payment. Regulation (EC) No 864/2004 inserted in Title IV of Regulation (EC) No 1782/2003 a special Chapter 10a: "Crop specific payment for Cotton".

A4.8 Decoupled Aid

The decoupled aid is paid to producers irrespective of their planting decisions. The number of hectares for which the payment is made is dependent on the level of production during the reference period 2001 to 2003.

The amount of decoupled aid differed by member state, and was set at:

- Greece: €966 per hectare,
- Spain: €1 509 per hectare,
- Portugal: €1 202 per hectare.

Coupled Aid

The coupled aid is payable on the opening of the bolls, rather than on harvest and all payments are made directly to the farmers and not, as before, via the ginners.

Under Regulation (EC) No 864/2004, for environmental reasons, base areas were established in order to limit the areas under cotton. These base areas determined the coupled aid, and were set at 370 000 hectares for Greece, 70 000 hectares for Spain and 360 hectares for Portugal.

⁶ In the case of hops, the decision to allow coupled aid was at the discretion of the individual Member State.

The amount of coupled aid per eligible hectare was set at:

- Greece: €594.0 per hectare for 300 000 hectares and €342.8 per hectare for the remaining 70 000 hectares,
- Spain: €1 039 per hectare,
- Portugal: €556 per hectare.

Under Article 69 of Regulation (EC) No 1782/2003, a country could deduct up to 10% of the decoupled area payment and redistribute it as a coupled payment subject to specific quality norms. This option was selected by the Spain government. The decoupled payment in Spain was reduced to €1 358 per hectare and a supplementary payment of €191 per hectare was made if the cotton area contained cotton fibre with maximum impurity of 5%, maximum humidity of 12% and yield higher than a local minimum.

Inter-branch organisations

The reform also provided funds (€4 million of payments) to create inter-branch organisations. These organisations were to be established between growers and at least one ginner with a view to improving the quality of cotton delivered to the ginner. The inter-branch organisations could establish rules on certain aspects of the contracts between ginners and growers and have the power to differentiate the level of crop-specific aid for their members according to the quality of cotton produced.

ANNEX 5 – THE EU COTTON SECTOR

A5.1. The international context

The EU cotton sector represents for only about 2% of the world cotton production, which for the 2006/2007 crop year was estimated at 24.86 million tonnes. The main three international players — China, USA and India — supply over 60% of the world cotton fibre. The C4 group of African countries⁷ represents about 4% of the world production. The expiration of the Multi-Fibre Agreement (MFA) in 2003 induced a considerable expansion of Asian textile industry and exports. Meanwhile, the decline of the EU textile industry squeezed the domestic sales of ginneries in Greece and Spain which were so increasingly obliged to look for market outlets outside the Community. Over the last five years, exports accounted for 72% of production in Greece and 45% of production in Spain. Greek exports are dominated by exports to Turkey and North Africa. In Spain, exports to the EU-15 were the most important until 2006 (Table A5.1).

Table A5.1: EU Cotton exports (tonnes, ginned cotton)

Greece	2000	2001	2002	2003	2004	2005	2006
Intra EU-15	86 599	116 235	47 457	58 869	43 800	39 400	45 629
Extra EU-15	203 353	210 100	179 018	225 354	243 639	192 960	286 762
Turkey	134 286	130 444	109 511	99 786	129 161	90 725	164 263
North Africa	17 664	12 571	11 345	18 388	47 473	47 070	55 895
Central Europe	32 003	33 458	27 751	26 741	23 508	14 700	23 111
Other	19 402	33 627	30 412	80 440	43 496	40 466	43 493
Total	289 952	326 335	226 474	284 224	287 439	232 361	332 391

Spain	2000	2001	2002	2003	2004	2005	2006
Intra EU-15	23 244	20 770	12 830	16 988	35 203	30 970	30 450
Extra EU-15	14 412	15 467	9 131	12 675	32 228	23 913	42 501
North Africa	10 238	11 019	8 291	5 603	12 085	8 691	16 168
ASEAN	1 972	509	348	119	1 279	1 572	8 605
Other	2 201	3 939	492	6 953	18 864	13 650	17 729
Total	37 656	36 237	21 961	29 662	67 431	54 883	72 952

Source: Eurostat.

The EU cotton market is not protected by tariff and cotton can be imported from and exported to the world market freely at the world market price. Despite that and its tiny world market share, the EU support system has been seriously criticised during the **Doha Development Agenda**. In fact, although the EU sector does not significantly affect the international trade, the nature of the support attracts criticism, as for the US, from less developed producing countries. In Cancun 2003, a group of African countries called for the elimination of subsidies and compensation for the damages caused to them by subsidies granted to cotton in richer

⁷ Benin, Burkina Faso, Chad and Mali.

countries. It followed the 2005 Hong Kong Declaration which set up a Sub-Committee on Cotton with the purpose to prioritise the reduction of trade-distorting subsidies to cotton. Moreover, the panel on cotton US subsidies launched by Brazil make the cotton policy a very sensitive issue.

Blue box support is a support under production limiting programmes that is exempted from the general reduction commitment for trade distorting agricultural support if the support given is in conformity with Art. 6(5) of the Agreement on Agriculture. This means that support should be production-limiting and the payments must be made on the basis of a fixed area and yield. Art. 6(5) does not establish any link between the Blue Box payment and the specific production conditions. Coupled payments can therefore be categorised as blue box, regardless of the obligation to either harvest the crop or to keep the cotton on the field until boll opening.

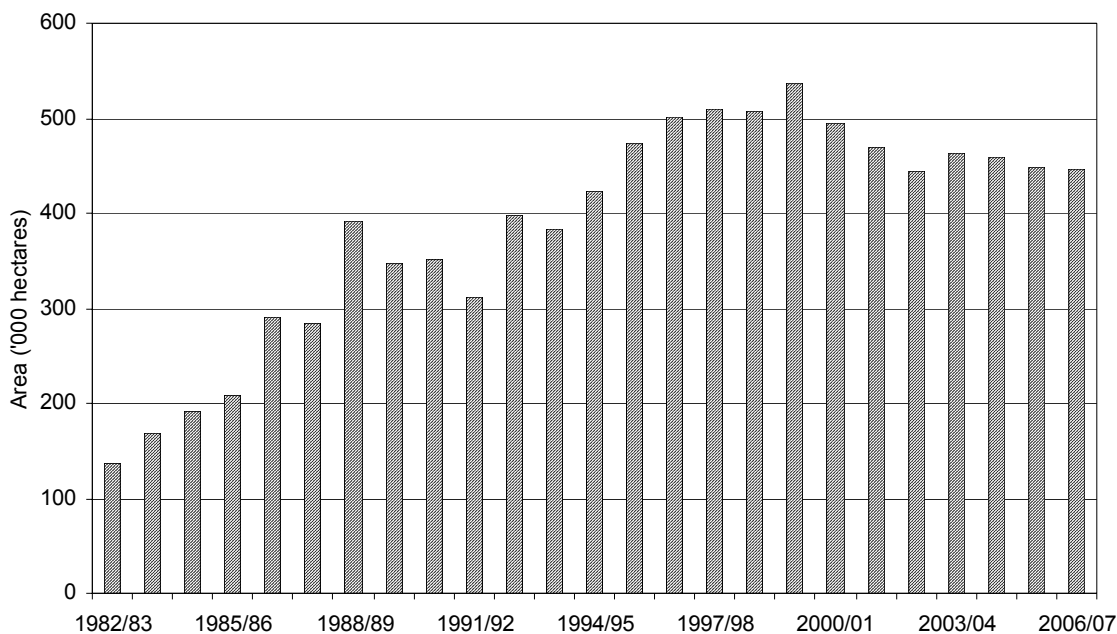
A5.2 Overview of Cotton Production

Total Cotton Area and Production

Cotton is produced in four EU-27 states, namely Greece, Spain, Portugal⁸ and Bulgaria. Production is dominated by Greece and Spain. Production in Portugal and Bulgaria was just 1 285 tonnes and 611 tonnes in 2005, respectively. Production ceased in Portugal in 2006 following the reform of the cotton regime. In the following sections, we focus on trends in Spain and Greece, the largest producers.

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 A5.1).

Diagram A5.1: EU Cotton area

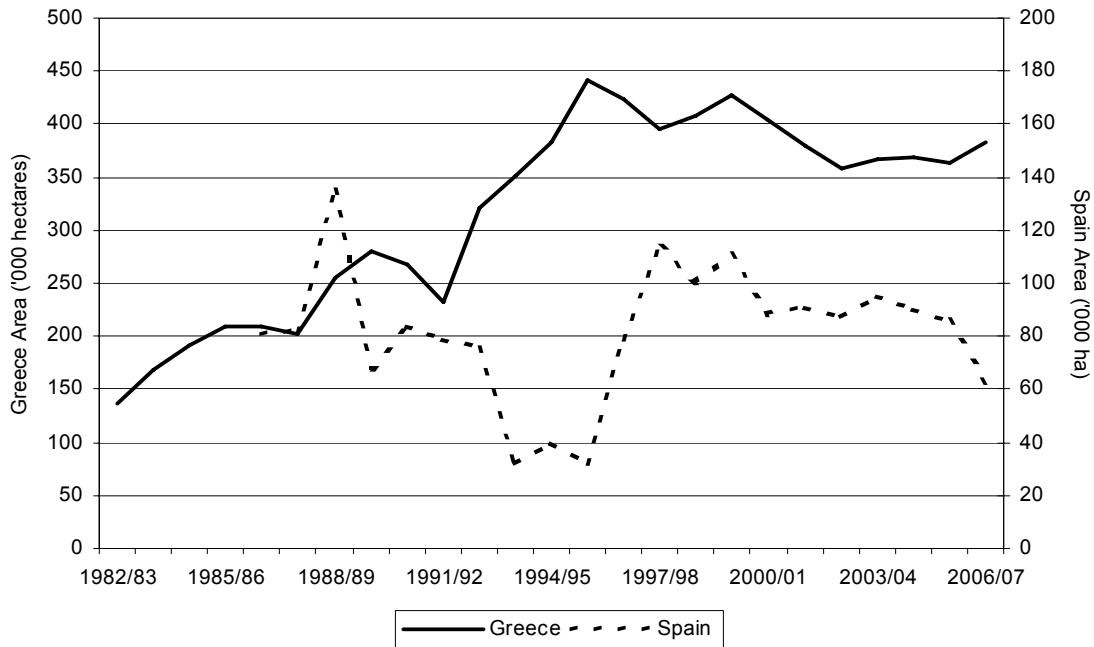


Source: DG AGRI, National Authorities, LMC (Note: Spanish data are only included from 1986/87 with its accession to the EU).

⁸ With only small volumes produced in Portugal, unginned cotton was transported to Spain for ginning.

In Greece the cotton area peaked in 1995/96 at 441 000 hectares. The area then fell to approximately 360 000 hectares, but rose to 383 000 hectares in 2006/07. In Spain, the picture has been more erratic: the area peaked in 1988 at 135 000 hectares and then declined dramatically in 1993/94 through to 1995/96 owing to drought. The area under cotton then revived, peaking at 114 000 hectares in 1997/98. The area under cotton fell to 63 000 hectares in 2006/07 (Diagram A5.2).

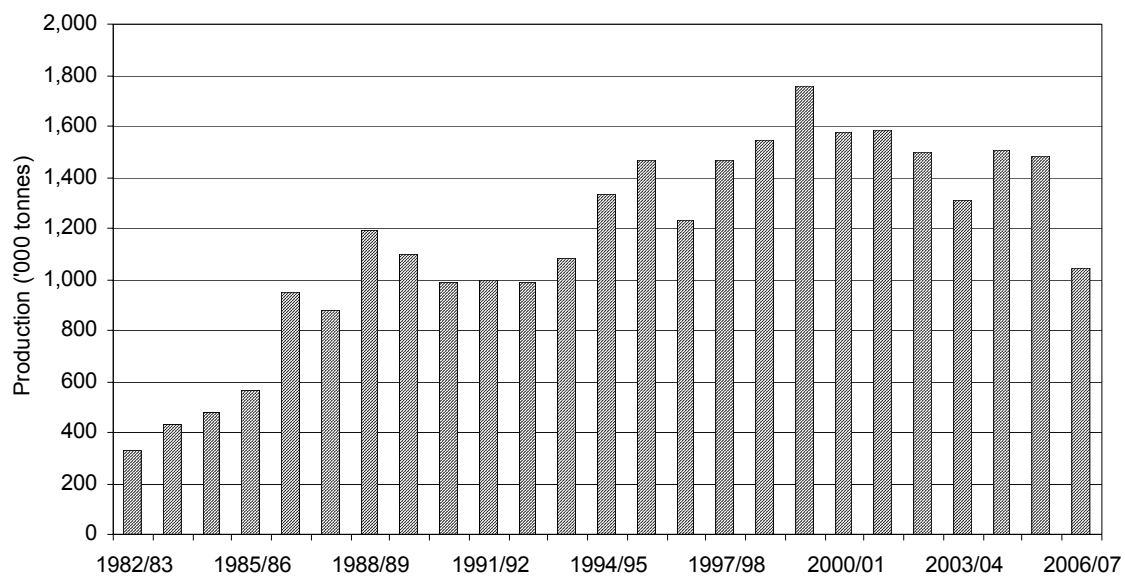
Diagram A5.2: EU-15 Harvested cotton area by country



Source: LMC (Note: Data for Spain cover only the period since accession to the EU).

With a growing area and rising yields, EU cotton production peaked in 1999/2000 at 1.76 million tonnes of unginned cotton (see Table A5.1a). In 2006/07, total output fell to its lowest level since the 1980s. This was due to a combination of impact of regime change (in Spain) and poor weather in Greece (Diagram A5.3).

Diagram A5.3: EU-15 Unginned cotton production



Source: LMC (Note: Data for Spain cover only the period since accession to the EU)

Table A5.1a: EU eligible production of unginned cotton

	Greece	Spain	Italy	Portugal	TOTAL
1981/82					
1982/83	333 162				333 162
1983/84	428 453				428 453
1984/85	481 246				481 246
1985/86	561 540				561 540
1986/87	667 779	284 550			952 329
1987/88	600 448	275 070			875 518
1988/89	805 856	383 169	99		1 189 124
1989/90	886 919	211 599	29		1 098 547
1990/91	709 871	281 838	34		991 743
1991/92	719 449	279 575			999 024
1992/93(*)	760 685	223 932			984 617
1993/94	985 676	98 883			1 084 559
1994/95	1 191 400	143 249			1 334 649
1995/96	1 364 798	104 400		1	1 469 199
1996/97	927 650	300 221		0	1 227 871
1997/98	1 085 482	379 358		102	1 464 942
1998/99	1 210 900	337 567		147	1 548 614
1999/2000	1 350 677	409 518		73	1 760 268
2000/2001	1 272 873	300 657		0	1 573 530
2001/2002	1 237 103	336 984		612	1 574 699
2002/2003	1 166 268	321 540		843	1 488 651
2003/2004	1 006 248	306 025		632	1 312 905
2004/2005	1 135 534	368 084		982	1 504 600
2005/2006	1 122 445	355 348		440	1 478 233

(*) adaptation of the quality standard of unginned cotton.
Source: DG AGRI

The cotton sector in Greece

Greek production is dominated by four NUTS2 regions (Central Macedonia, East Macedonia, Thessalia and Sterea Ellada). These areas account for 96% of the total cotton area (Table A5.2).

Table A5.2: Greek cotton area by NUTS 2 Region (hectares)

	2004/05	2005/06
Anatoliki Makedonia	54.7	53.6
Kentriki Makedonia	97.0	95.1
Dytiki Makedonia	0.0	1.0
Thessalia	150.7	147.6
Ipeiros	466.0	455.0
Dytiki Ellada	8.1	7.6
Stereia Ellada	54.0	53.1
Peloponnisos	1.0	1.0
Attiki	711.0	684.0
	365.6	358.1

Source: Ministry of Agriculture.

Cotton accounts for 9.1% of final Greek agricultural output. A breakdown of the importance of production by region is not available.

There are 79 700 farmers involved in cotton farming in Greece; these are concentrated in Anatoliki Makedonia, Kentriki Makedonia, Thessalia and Stereia Ellada.

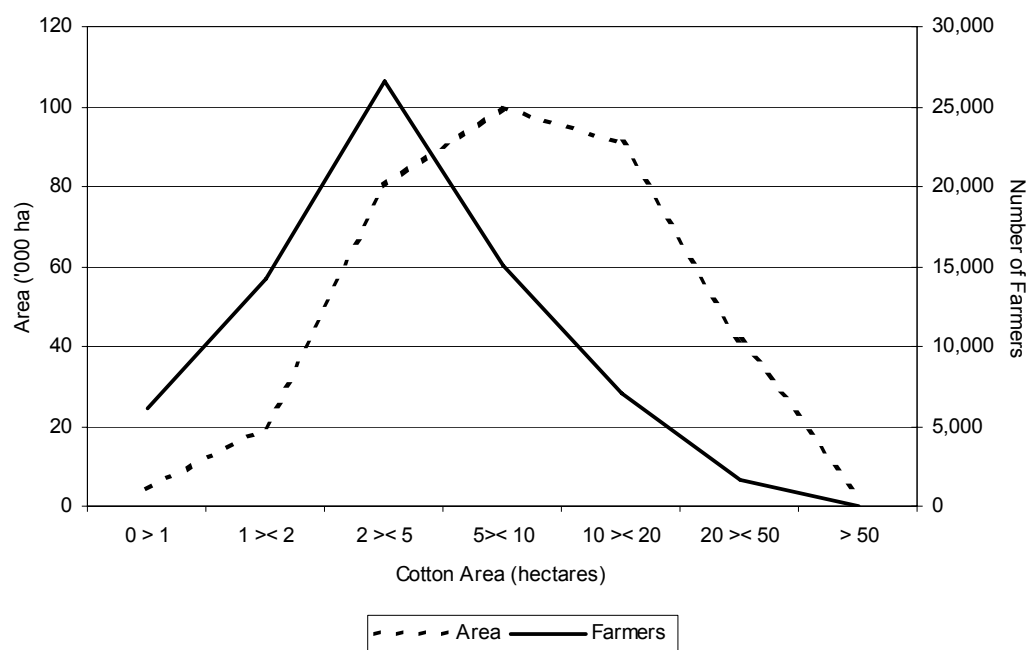
The majority of farmers grow between 2 and 5 hectares of cotton. The average cotton area across all farms was 4.5 hectares in 2005 (Diagram A5.4). FADN data give an indication of the importance of cotton to the total farm area. In 20% of cases in Makedonia, cotton accounted for over 75% of the farm area, while in Thessalia in 36% of cases cotton accounted for over 75% of the total farm area (Table A5.3).

Table A5.3: The importance of cotton to total farm area (number of observations)

Area under cotton (%)	1998	1999	2000	2001	2002	2003	2004	Average
Makedonia-Thraki								
>25%	207	171	189	182	199	170	186	29%
25%–49%	242	219	216	201	184	196	187	31%
50%–74%	176	159	178	143	114	104	116	21%
75%–99%	82	86	73	69	65	64	62	11%
100%	64	73	54	56	50	54	45	8%
Ipiros-Peloponi / Thessalia / Stereia Ellas								
>25%	37	46	43	43	42	36	36	10%
25%–49%	115	98	105	95	79	93	77	21%
50%–74%	128	116	158	144	134	125	121	33%
75%–99%	159	110	115	108	90	103	92	24%
100%	57	53	50	45	54	49	57	12%

Source: FADN.

Diagram A5.4: Harvested cotton area by farm size in Greece, 2005



In terms of other crops grown on cotton farms, cereals, particularly durum wheat and maize, dominate. Sugar beet is also important.

Over 99% of Greek cotton production is grown under irrigated conditions (Table A5.4). The most important type is sprinkle (around 40% of total area), followed by drip (a little more than 30%). The rest (around 30%) is gravity. The share of drip irrigation has been growing in recent years. No cotton is grown under plastic.

Table A5.4: Cotton area in Greece by irrigation type ('000 hectares)

	2001	2002	2003	2004	2005
Irrigated	389	377	373	361	355
Non-irrigated	15	10	5	4	4
Total	404	388	378	366	358

Source: Ministry of Agriculture.

The cotton sector in Spain

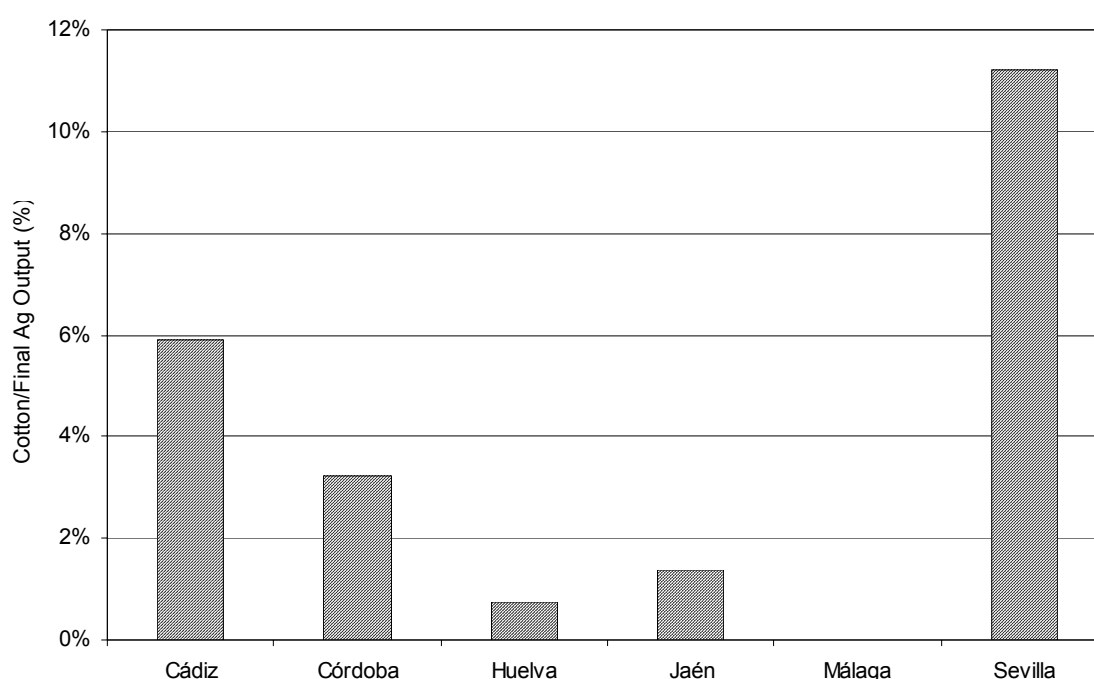
Spanish cotton production is dominated by Andalusia, which accounts for 98% of its national production. Within Andalusia, the cotton area and production are dominated by Sevilla; Cadiz and Cordoba are also important (Table A5.5).

Table A5.5: Spanish cotton area by NUTS 3 Region (hectares)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Cádiz	8.9	12.9	13.9	15.1	15.7	16.0	12.6	15.7	13.7	14.5
Córdoba	8.7	14.9	11.2	13.2	9.6	10.1	10.3	11.8	12.6	11.8
Huelva	720.0	728.0	846.0	1.1	944.0	1.1	1.0	1.2	1.2	1.1
Jaén	7.1	9.1	5.9	6.5	6.7	6.8	6.2	7.0	7.5	7.0
Málaga	210.0	165.0	107.0	80.0	167.0	63.0	47.0	49.0	48.0	33.0
Sevilla	48.2	70.3	63.6	69.9	56.4	54.9	53.7	57.0	52.9	51.7
Murcia	2.9	3.3	2.9	2.5	2.1	2.5	2.4	1.9	1.7	1.9
Total	76.8	111.3	98.5	108.4	91.6	91.5	86.4	94.7	89.5	88.1

Source: Data on the province of Andalusia (Cádiz, Córdoba, Huelva, Jaén, Málaga and Sevilla): Boletín de Información Agraria y Pesquera. Consejería de Agricultura y Pesca. Junta de Andalucía; Data on the province of Murcia: Spanish Ministry of Agriculture and Fishery (MAPA).

Cotton accounts for 1.3% of final Spanish agricultural output, but it is particularly important in Sevilla (11.2%), Cadiz (5.9%) and Cordoba (3.2%) (Diagram A5.5).

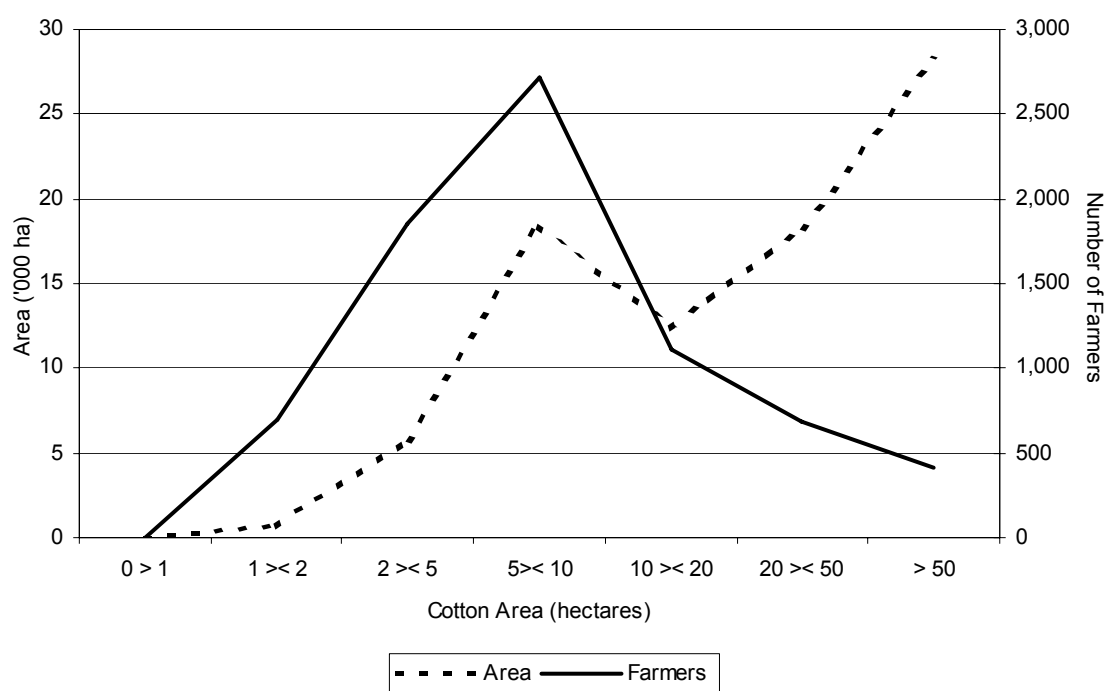
Diagram A5.5: Cotton as % of Total Agricultural Output Value in Andalusia, Spain, 2003 to 2005

There are 9 500 farmers involved in cotton farming in Andalusia; they are concentrated in Sevilla, Cadiz and Cordoba.

The majority of farmers grow less than 10 hectares of cotton, although the inclusion of the cotton area grown on bigger farms brings the average cotton area across all farms to close to 10 hectares (Diagram A5.6). For many of these farms, cotton is just one of the crops grown. On average, cotton accounts for 50% of the farm area on cotton growing holdings in Jaen, 28% in Sevilla and 24% in Cordoba.

Of the total number of farms, 38% grow solely cotton; they account for 25% of the total cotton area. Wheat, maize, sunflower and sugar beet are the other main crops that are also grown by farmers who cultivate cotton (Table A5.6).

Diagram A5.6: Harvested cotton area by farm size in Spain



Source: LMC.

Table A5.6: Crop specialisation in Andalusia

By farm	2000/01	2001/02	2002/03	2003/04	Average
Only cotton	3 159	3 083	3 027	3 619	3 222
Cotton and tree crops	174	155	247	299	219
Cotton and rainfed wheat and sunflower	1 136	1 214	1 245	1 355	1 238
Cotton and maize	364	1 102	1 359	1 382	1 052
Cotton and irrigated wheat and sunflower	1 316	718	802	794	908
Cotton and vegetables	219	253	296	366	284
Cotton and sugar beet	1 416	1 139	1 236	1 198	1 247
Cotton and other arable crops	311	241	399	405	339

By area (ha)					
Only cotton	26 095	23 980	16 144	20 784	21 751
Cotton and tree crops	4 071	3 801	4 312	4 248	4 108
Cotton and rainfed wheat and sunflower	14 604	15 895	15 340	16 649	15 622
Cotton and maize	3 482	14 192	16 729	18 065	13 117
Cotton and irrigated wheat and sunflower	20 996	13 881	12 978	12 037	14 973
Cotton and vegetables	3 116	3 066	2 972	3 644	3 200
Cotton and sugar beet	12 416	11 210	11 233	11 396	11 564
Cotton and other arable crops	2 999	2 907	4 711	5 632	4 062

Source: Diagnóstico del sector Algodonero Andaluz. 2005. Consejería de Agricultura y Pesca. Junta de Andalucía.

Around 96% of production is grown under irrigated conditions in Andalusia. In Murcia, all the cotton area is irrigated. Gravity irrigation is the most popular system (Table A5.7). Between 2000/01 and 2003/04, 64% of the cotton was grown under plastic. However, in 2006 with the increased use of agri-environmental measures and a move to a less intensive production system, the area under plastic fell to zero.

Table A5.7: Cotton areas in Andalusia by irrigation type (hectares)

	2000/01	2001/02	2002/03	2003/04
Irrigated / rainfed				
Rainfed	3.5	3.9	2.3	3.9
Irrigated	84.3	85.0	82.1	88.6
Type of water application				
Rainfed	3.5	3.9	2.3	3.9
Sprinkle	19.1	17.8	15.4	15.0
Drip	21.3	22.1	21.8	26.6
Gravity	43.9	45.1	44.9	47.0
Total	87.8	88.9	84.4	92.5

Source: LMC.

The cotton sector in Portugal

Table A5.8: Ginned cotton in Portugal

	2001/02	2002/03	2003/04	2004/05	2005/06
Surface (ha)	216	497	373	273	194
Production (t)	200	281	211	326	152
Yield (t/ha)	0.926	0.565	0.566	1.194	0.784
Imports (t)	119 000	105 000	85 000	72 000	63 000
Exports (t)	0	0	0	0	0
Consumption (t)	125 000	115 000	85 000	70 000	63 000
Begin Stks (t)	34 000	28 000	18 000	18 000	21 000
End Stks (t)	28 000	18 000	18 000	21 000	21 000

During the last marketing years the cotton area in **Portugal** was between 194 and 497 ha. Regarding the production of ginned cotton it fluctuated between 152 and 326 tonnes. While the local production is very limited the textile industry has important needs: 125 000 tonnes in 2001/2002. The consumption decreased significantly during the last years to 63 000 tonnes in 2005/2006. To meet its needs Portugal imports important quantities of cotton: 119 000 tonnes in 2001/2002 and 63 000 tonnes in 2005/2006. In 2006 the area for which the aid has been claimed (according to Article 3(1)(a) of Regulation (EC) No 1973/2004) fell to zero.

The cotton sector in Bulgaria

According to ICAC the area cultivated with cotton in Bulgaria between 2001/2002 and 2005/2006 stabilised at around 9 000ha with a production of 2 000 tonnes of ginned cotton. As the annual consumption was estimated around 1 800-2 000 tonnes for the same period, Bulgaria had to import between 17 000-20 000 tonnes of ginned cotton.

For 2006 the cotton area was significantly reduced to 2 000 ha (USDA). Also the imports fell considerably to 11 000 tonnes of ginned cotton in order to cover the needs of the industry.

Nota bene, for Bulgaria, although support for cotton is included in the SAPS regime currently applied, Article 110a of Regulation (EC) No 1782/2003 provides for a base area and amount for the crop-specific payment for Bulgaria.

Table A5.9: Ginned cotton in Bulgaria

	2001/02	2002/03	2003/04	2004/05	2005/06
Surface (ha)	9 000	9 000	9 000	9 000	9 000
Production (t)	2 000	2 000	2 000	2 000	2 000
Yield (t/ha)	0.222	0.254	0.254	0.257	0.257
Imports (t)	20 000	19 000	18 000	17 000	17 000
Exports (t)	1 000	1 000	1 000	1 000	1 000
Consumption (t)	20 000	20 000	19 000	19 000	18 000
Begin Stks (t)	8 000	9 000	9 000	9 000	9 000
End Stks (t)	9 000	9 000	9 000	9 000	9 000

Source: ICAC.

A5.3 Labour

The FADN data⁹ suggest that the importance of family/unpaid labour for cotton production declines as the farm size increases. In Greece, the number of unpaid labour hours worked per hectare falls from 287 to 150 as the size of the farm increases in Makedonia-Thraki and from

⁹ The estimates of family labour time are based 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 crop 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.

362 to 81 in Thessalia/Stereia Ellas (Table A5.8). In Spain, the number of labour hours worked per hectare falls from 183 to 69 as the size of the farm increases (Table A5.10).

Table A5.8: Greece, Unpaid labour hours (hours per hectare)

	2000	2001	2002	2003	2004	Average
Makedonia-Thraki						
> 5 ha	293	292	308	282	259	287
5–10 ha	226	215	219	211	193	213
10–20 ha	163	134	160	105	156	144
< 20 ha	236	70	200	121	122	150
Ipiros-Peloponi/Thessalia/Stereia Ellas						
> 5 ha	354	354	399	332	371	362
5–10 ha	197	196	208	210	209	204
10–20 ha	135	142	150	121	158	141
< 20 ha	79	80	62	95	87	81

Source: FADN

Table A5.9: Greece, Labour hours spent on cotton production, 2005-06 (hours per hectare)

Farm Size	Labour	2005	2006	Change
< 5 ha	Household	89.55	90.94	2%
	Paid	39.89	32.23	-19%
	Contracted	25.08	28.57	14%
	Total	154.52	151.74	-2%
5–10 ha	Household	79.13	87.62	11%
	Paid	32.61	29.86	-8%
	Contracted	6.39	5.86	-8%
	Total	118.13	123.34	4%
10–20 ha	Household	82.17	76.77	-7%
	Paid	22.41	27.23	22%
	Contracted	30.35	25.80	-15%
	Total	134.93	129.80	-4%
> 20 ha	Household	80.78	73.03	-10%
	Paid	28.64	28.74	0%
	Contracted	29.19	27.08	-7%
	Total	138.61	128.85	-7%

Source: LMC.

Table A5.9: Greece, Labour hours spent on cotton production, 2005-06 (hours per hectare)

	2000	2001	2002	2003	2004	Average
< 10 ha	166	125	151	238	236	183
10–20 ha	94	83	102	162	151	119
> 20 ha	61	61	73	81	71	69

Source: FADN.

The falling of labour time with the farm size is confirmed also by the questionnaire, although the hours worked per hectare are found to be less than in the FADN sample across all size categories (Table A5.11). In general, data from the questionnaires suggest that the number of unpaid labour hours is more constant over farm sizes than was the case with the FADN data, varying between 75 and 90 hours per hectare. It is noteworthy that the number of hours is found to be considerably less than those reported by FADN. According to the responses to the LMC's questionnaire, cotton is the most important user of family labour in all size categories. This has not changed much over the last five years.

Table A5.11: Spain, labour hours spent on cotton production, 2005-06 (hours per hectare)

Farm Size	Labour	2005	2006	Change
< 10 ha	Household	58.7	58.1	-1%
	Paid	0.3	–	–
	Contracted	8.1	5.7	-30%
10–20 ha	Household	57.2	55.2	-3%
	Paid	–	3.0	–
	Contracted	9.8	9.1	-7%
> 20 ha	Household	23.1	24.6	6%
	Paid	12.5	9.3	-26%
	Contracted	4.4	3.4	-23%

Source: LMC.

ANNEX 6 – COSTS OF PRODUCTION AND GROSS MARGIN

A6.1 Production costs prior to the regime change

On the basis of data of farm producing only cotton, the structure of the production costs for this crop can easily be observed. It emerges a quite different picture of the farming costs in Greece and Spain.

In **Greece**, the structure of the costs in the regions concerned is quite similar. It strikes a relatively high proportion of fixed costs per hectare of the total production costs —above 40%. Depreciation and rent are the major reported component of the fixed costs. In Macedonia-Thraki, costs are higher in the smallest farm and the absolute value and the proportion of fixed costs tend to decrease quite regularly with the increase of the farmed area's size, regardless whether family labour is included or excluded. No trend is instead clear in Thessalia (Tables A6.1 and A6.2).

Table A6.1: Average production costs for 100% cotton farms, Macedonia-Thraki (€/hectare)

	2000	2001	2002	2003	2004
Seed	130.9	135.0	106.5	118.1	122.2
Fertiliser	167.6	163.9	148.9	143.6	154.5
Crop protection	196.6	195.8	180.4	207.6	212.0
Other specific costs	24.1	19.0	27.9	33.5	29.0
Energy and fuel	177.7	182.7	171.1	176.6	182.6
Contracted labour/services	293.8	272.0	273.9	262.8	263.4
Water/irrigation	95.6	106.9	107.9	102.9	108.3
Other direct costs	12.8	14.3	9.4	12.1	13.2
Labour (paid)	38.6	42.9	47.8	62.7	83.4
Total variable costs	1 137.8	1 132.5	1 073.9	1 119.8	1 168.6
Machinery	52.3	55.2	48.3	50.6	56.3
Depreciation	443.0	469.5	537.8	517.2	572.0
Rent	191.6	215.6	276.1	281.2	273.6
Interest	11.2	7.9	10.9	11.0	12.0
Total fixed costs	698.1	748.2	873.1	860.1	913.9
Total costs	1 835.9	1 880.7	1 947.0	1 980.0	2 082.5
Total unpaid labour (hrs)	244.3	229.8	239.5	209.1	194.6
Average hourly wage	2.2	2.4	2.6	2.7	3.0
Total unpaid labour	543.9	550.9	611.7	569.3	593.0
Total cost including unpaid labour					
Variable cost	1 627.3	1 628.3	1 624.4	1 632.2	1 702.3
Fixed cost	752.5	803.3	934.3	917.1	973.2
Total cost	2 379.8	2 431.6	2 558.6	2 549.3	2 675.5

Note: 1. To derive costs including family labour we have valued family labour at the paid labour rate.
2. In deriving total costs it is assumed that 90% of unpaid labour is attributed to variable costs and 10% to fixed costs.

Source: FADN, LMC

Table A6.2: Average cotton production costs for 100% cotton farms, Thessalia/Sterea Ellas (€/hectare)

	2000	2001	2002	2003	2004	Average
Seed	142.0	152.7	155.4	162.5	201.7	162.9
Fertiliser	144.5	146.0	160.4	149.5	163.9	152.9
Crop protection	90.8	88.7	106.6	116.2	132.8	107.0
Other specific costs	20.4	16.7	17.0	9.2	11.8	15.0
Energy and fuel	199.3	197.4	223.1	249.6	279.8	229.8
Contracted labour/services	269.5	283.4	264.9	244.0	247.5	261.9
Water/irrigation	26.4	24.5	38.5	41.8	48.4	35.9
Other direct costs	13.3	12.3	20.1	33.9	17.8	19.5
Labour (paid)	31.0	23.7	30.2	35.7	30.3	30.2
Total variable costs	937.3	945.3	1 016.1	1 042.4	1 134.1	1 015.0
Machinery	39.3	44.6	45.8	43.7	37.6	42.2
Depreciation	370.3	349.3	389.0	384.0	339.0	366.3
Rent	205.7	229.6	254.2	275.2	253.5	243.6
Interest	57.7	18.6	18.1	15.6	8.4	23.7
Total fixed costs	673.1	642.1	707.1	718.6	638.6	675.9
Total costs	1 610.4	1 587.4	1 723.2	1 761.0	1 772.6	1 690.9
Total unpaid labour (hrs)	231.3	239.6	248.2	210.0	220.3	229.9
Average hourly wage	2.2	2.4	2.6	3.0	3.1	2.7
Total unpaid labour	516.7	582.1	656.9	640.0	682.5	615.6
Total cost including unpaid labour						
Variable cost	1 402.3	1 469.2	1 607.4	1 618.4	1 748.3	1 569.1
Fixed cost	724.7	700.3	772.8	782.6	706.8	737.4
Total cost	2 127.1	2 169.5	2 380.1	2 400.9	2 455.2	2 306.6

Note: 1. To derive costs including family labour we have valued family labour at the paid labour rate.
2. In deriving total costs it is assumed that 90% of unpaid labour is attributed to variable costs and 10% to fixed costs.

Source: FADN, LMC

The components of the variable costs per hectare are rather stable over the years, with a prevalence of contracted labour and services, crop protection and fertiliser products, and energy and fuels. Water/irrigation is an important cost in Makedonia-Thraki and less relevant in Thessalia.

Labour is an important element of the production cost. Assuming as opportunity cost "the paid wage", unpaid labour alone makes up about one-fourth/one-fifth of the total production costs per hectare. If unpaid labour is not considered among the costs, contracted services represents about one-sixth of the total costs and about one-fifth of the variable costs. Taken together, contracted services, paid and unpaid labour represent about 35–40% of the total production cost of cotton.

Unlike in Greece, the cost structure of the **Spanish** farms producing only cotton is far less affected by depreciation. Fixed costs per hectare are much less important and tend to decrease over time in absolute and relative value. In 2004 they represented about 15% of the total production costs. Rent is the main element of the fixed cost, although strongly decreasing over 2000–2004. Among the variable costs, contracted labour/services is the major element. It is

followed by fertiliser and crop protection products, and water/irrigation. In the period considered, in absolute value, variable costs increased considerably while fixed costs decreased (Table A6.3).

With the extension of the farm size, the costs of inputs per hectare seem to decrease while the fixed costs move to the opposite direction. Total cost per hectare increase significantly with the size of the farm, when family labour is included, while it slightly decrease when family labour is excluded.

As for Greece, in Spain labour is an important element of the cost of cotton production. Contracted labour/services and paid labour weighted about one-third of the total variable costs (and one-fourth of the total costs). If unpaid labour wage is added, the spending for labour and services is about half of the total costs.

Table A6.3: Average production costs for 100% cotton farms, Spain, FADN (€/hectare)

	2000	2001	2002	2003	2004
Seed	119.9	206.7	202.1	120.6	130.3
Fertiliser	146.7	189.3	286.3	230.4	253.6
Crop protection	163.5	165.4	211.8	452.1	325.6
Other specific costs	54.5	61.4	62.0	72.6	71.9
Energy and fuel	138.2	116.6	92.5	59.0	78.7
Contracted labour/services	196.8	152.7	162.7	308.6	464.8
Water/irrigation	93.4	73.6	76.3	165.4	237.2
Other direct costs	27.4	46.2	46.5	55.6	94.2
Labour (paid)	85.2	94.7	113.6	96.3	76.6
Total variable costs	1 025.6	1 106.6	1 253.8	1 560.6	1 732.8
Machinery	46.5	54.2	66.4	44.5	58.8
Depreciation	261.1	121.9	87.1	75.7	61.8
Rent	180.3	255.5	323.7	199.7	188.2
Interest	25.7	20.4	15.8	9.1	5.1
Total fixed costs	513.6	452.0	493.0	329.1	313.9
Total costs	1 539.2	1 558.7	1 746.8	1 889.7	2 046.7
Total unpaid labour (hrs)	107.0	93.1	110.9	191.8	182.1
Average hourly wage	5.1	5.4	5.8	5.2	5.4
Total unpaid labour	542.3	504.9	647.4	994.6	990.5
Total cost including unpaid labour					
Variable cost	1 513.7	1 561.1	1 836.5	2 455.7	2 624.3
Fixed cost	567.8	502.5	557.7	428.5	412.9
Total cost	2 081.5	2 063.6	2 394.2	2 884.3	3 037.2

Note: 1. To derive costs including family labour we have valued family labour at the paid labour rate.
2. In deriving total costs it is assumed that 90% of unpaid labour is attributed to variable costs and 10% to fixed costs.

Source: FADN, LMC

A6.2 Comparison with other crops

In Greece, the costs of production per hectare of cotton are on average higher than the other main alternative crops (durum wheat, maize and for Spain sunflower). The structure of the production costs is closer to maize, with a more intensive use of fertilisers and crop protection products, water and contracted services. The use of services and paid labours is in general

more important for growing cotton than for maize. The unpaid labour is rather similar in Macedonia but far lower than that of maize in Thessaly (Tables A6.4 and A6.5).

Table A6.4: Average maize production costs, Thessalia/Stereia Ellas, FADN definition (€/hectare)

	2000	2001	2002	2003	2004	2005 (e)	2006 (e)
Seed	132.2	143.4	131.5	135.3	124.7	127.4	141.5
Fertiliser	250.1	260.9	246.3	260.1	260.9	265.6	293.7
Crop protection	73.1	67.4	81.7	71.1	88.6	90.0	98.7
Other specific costs	45.9	37.1	53.4	38.9	34.5	35.3	37.7
Energy and fuel	101.9	66.5	85.7	117.6	130.7	133.6	142.6
Contracted labour/services	203.5	207.2	173.0	176.3	167.5	171.5	178.2
Water/irrigation	111.2	108.4	100.2	97.9	99.3	101.5	104.5
Other direct costs	10.6	11.1	9.4	7.5	12.4	12.7	13.5
Labour (paid)	6.7	9.3	22.8	24.3	35.3	36.1	38.6
Total variable costs	935.3	911.3	904.1	929.0	953.9	973.7	1 049.1
Machinery	41.3	36.5	33.1	23.0	32.5	32.5	32.5
Depreciation	208.4	176.8	243.0	250.8	306.8	306.8	306.8
Rent	112.8	76.2	226.9	214.3	184.3	184.3	184.3
Interest	13.7	4.5	0.0	1.8	1.9	1.9	1.9
Total fixed costs	376.2	294.0	502.9	489.8	525.5	525.5	525.5
Total costs	1 311.5	1 205.4	1 407.1	1 418.7	1 479.5	1 479.5	1 479.5
Total unpaid labour (hrs)	434.0	513.5	423.6	406.7	445.8	445.8	445.8
Average hourly wage	2.2	2.4	2.6	3.0	3.1	3.2	3.3
Total unpaid labour	969.2	1 247.4	1 121.3	1 239.3	1 381.3	1 430.5	1 480.8
Total cost including unpaid labour							
Variable cost	1 807.5	2 034.0	1 913.3	2 044.4	2 197.1	2 261.1	2 381.8
Fixed cost	473.2	418.8	615.1	613.7	663.7	668.6	673.6
Total cost	2 280.7	2 452.8	2 528.3	2 658.1	2 860.8	2 929.7	3 055.4

Source: 2003-2004 FADN, 2005 and 2006 based on LMC questionnaire responses.

Table A6.5: Average maize production costs, Makedonia-Thraki, FADN definition (€/hectare)

	2000	2001	2002	2003	2004	2005 (e)	2006 (e)
Seed	146.9	121.4	149.6	154.8	151.0	153.1	157.9
Fertiliser	237.5	169.2	223.5	216.0	227.8	232.2	245.7
Crop protection	134.9	87.4	121.6	133.6	144.1	146.0	149.9
Other specific costs	12.0	10.6	26.8	40.0	32.3	32.8	34.0
Energy and fuel	144.8	133.9	157.0	194.1	165.6	167.8	174.1
Contracted labour/services	130.1	139.3	135.8	141.9	128.7	129.4	136.4
Water/irrigation	78.9	66.7	65.7	75.4	55.2	55.9	57.8
Other direct costs	9.1	10.5	12.5	6.0	8.2	8.4	8.7
Labour (paid)	18.1	3.6	44.2	10.1	46.4	47.0	48.8
Total variable costs	912.4	742.6	936.8	971.9	959.4	972.6	1 013.3
Machinery	41.4	31.7	26.3	38.6	47.6	47.6	47.6
Depreciation	349.3	307.2	424.6	392.7	342.8	342.8	342.8
Rent	212.0	193.7	190.0	173.5	142.3	142.3	142.3
Interest	20.6	28.2	12.5	2.5	1.5	1.5	1.5
Total fixed costs	623.2	560.8	653.4	607.3	534.2	534.2	534.2
Total costs	1 535.7	1 303.4	1 590.1	1 579.2	1 493.6	1 493.6	1 493.6
Total unpaid labour (hrs)	252.5	217.7	199.9	190.1	193.8	193.8	193.8
Average hourly wage	2.2	2.4	2.6	2.7	3.0	3.2	3.3
Total unpaid labour	562.3	522.0	510.6	517.6	590.6	622.0	643.9
Total cost including unpaid labour							
Variable cost	1 418.5	1 212.4	1 396.3	1 437.7	1 490.9	1 532.4	1 592.8
Fixed cost	679.5	613.0	704.4	659.1	593.3	596.4	598.6
Total cost	2 097.9	1 825.4	2 100.7	2 096.8	2 084.1	2 128.8	2 191.4

Source: 2000–2004 FADN, 2005 and 2006 based on LMC questionnaire responses.

As for durum wheat, the input of contracted services and labour and unpaid labour is far less important, both in relative and particularly absolute terms. The main variable cost elements are, in order of priority, fertilisers, seed, services and energy (Tables A6.6 and A6.7).

Table A6.6: Average durum wheat production costs, Thessaly/Stereia Ellas, FADN definition (€/hectare)

	2000	2001	2002	2003	2004	2005 (e)	2006 (e)
Seed	64.8	74.0	75.9	62.5	79.5	81.2	90.2
Fertiliser	114.8	105.2	126.9	106.8	123.1	125.4	138.6
Crop protection	28.9	33.0	54.2	40.4	41.2	41.9	46.0
Other specific costs	1.6	0.8	9.6	1.7	3.2	3.2	3.5
Energy and fuel	52.1	59.2	41.2	34.2	43.4	44.3	47.4
Contracted labour/services	58.6	71.5	52.7	57.6	70.2	71.9	74.7
Water/irrigation	1.8	1.1	2.1	0.2	0.7	0.8	0.8
Other direct costs	8.9	7.0	5.7	0.0	0.5	0.5	0.6
Labour (paid)	8.9	12.0	30.2	13.8	25.4	26.0	27.7
Total variable costs	340.4	364.0	398.5	317.2	387.3	395.2	429.4
Machinery	17.6	18.5	29.9	21.3	13.3	13.3	13.3
Depreciation	147.1	139.3	90.9	144.4	118.2	118.2	118.2
Rent	64.3	54.0	105.8	96.5	122.1	122.1	122.1
Interest	0.0	2.6	0.0	1.6	0.0	0.0	0.0
Total fixed costs	228.9	214.4	226.7	263.7	253.5	253.5	253.5
Total costs	569.3	578.4	625.2	580.9	640.8	640.8	640.8
Total unpaid labour (hrs)	123.1	129.0	89.6	92.4	97.9	97.9	97.9
Average hourly wage	2.2	2.4	2.6	3.0	3.1	3.2	3.3
Total unpaid labour	274.9	313.3	237.1	281.4	303.3	314.1	325.2
Total cost including unpaid labour							
Variable cost	587.9	646.0	611.9	570.5	660.3	677.9	722.0
Fixed cost	256.4	245.7	250.4	291.8	283.8	284.9	286.0
Total cost	844.3	891.7	862.3	862.3	944.1	962.8	1 008.0

Source: 2000–2004 FADN, 2005 and 2006 based on LMC questionnaire responses.

Table A6.7: Average durum wheat production costs, Makedonia-Thraki, FADN definition (€/hectare)

	2000	2001	2002	2003	2004	2005 (e)	2006 (e)
Seed	70.3	75.8	75.0	73.2	70.1	71.1	73.4
Fertiliser	98.8	97.3	93.3	96.6	102.3	104.3	110.3
Crop protection	41.4	43.5	38.0	40.8	48.0	48.7	49.9
Other specific costs	8.9	9.1	7.8	8.4	9.1	9.2	9.6
Energy and fuel	53.6	53.4	50.2	51.5	51.2	51.9	53.8
Contracted labour/services	74.7	70.4	75.7	57.5	55.5	55.8	58.8
Water/irrigation	2.8	2.1	1.5	1.8	2.2	2.3	2.4
Other direct costs	5.6	5.9	5.7	7.9	8.8	8.9	9.2
Labour (paid)	7.9	9.6	3.6	10.2	13.1	13.2	13.7
Total variable costs	364.2	367.3	350.8	348.0	360.3	365.4	381.2
Machinery	16.6	21.2	16.5	19.2	20.7	20.7	20.7
Depreciation	163.8	159.8	171.8	155.3	165.4	165.4	165.4
Rent	102.9	101.5	104.4	105.3	109.9	109.9	109.9
Interest	10.8	5.5	9.7	3.2	0.8	0.8	0.8
Total fixed costs	294.1	288.0	302.4	283.1	296.7	296.7	296.7
Total costs	658.2	655.3	653.2	631.1	657.1	657.1	657.1
Total unpaid labour (hrs)	78.4	79.4	76.3	88.9	78.9	78.9	78.9
Average hourly wage	2.2	2.4	2.6	2.7	3.0	3.2	3.3
Total unpaid labour	174.5	190.5	194.8	242.1	240.3	253.1	262.0
Total cost including unpaid labour							
Variable cost	521.2	538.7	526.1	565.9	576.6	593.1	616.9
Fixed cost	311.5	307.1	321.9	307.3	320.8	322.1	322.9
Total cost	832.7	845.7	848.0	873.2	897.4	915.2	939.9

Source: 2000–2004 FADN, 2005 and 2006 based on LMC questionnaire responses.

In **Spain** the situation is similar. The difference with the cost of producing maize is however more pronounced. Costs of growing maize are about one-third less than those for cotton. In particular, costs for seed and energy are relatively higher for maize, while costs for crop protection products are relatively higher for cotton. Contracted labour and services, as well as water and fertiliser represent a similar share in the variable cost structure of the two crops. Unpaid labour is about 80% higher in cotton than in maize, although the weight on the total cost of production is similar in the two crops (Tables A6.8, A6.9 and A6.10).

Table A6.8: Average durum wheat production costs Spain, FADN definition (€/hectare)

	2000	2001	2002	2003	2004	2005 (e)	2006 (e)
Seed	45.3	69.0	96.0	66.4	58.2	58.2	58.2
Fertiliser	52.7	83.2	70.2	103.5	123.7	123.7	123.7
Crop protection	26.3	33.3	46.6	41.2	37.8	37.8	37.8
Other specific costs	2.1	1.1	0.0	1.8	0.7	0.7	0.7
Energy and fuel	49.0	42.9	64.5	17.4	47.2	47.2	47.2
Contracted labour/services	19.1	51.0	14.5	47.0	32.9	32.9	32.9
Water/irrigation	0.0	24.0	34.6	0.0	0.0	0.0	0.0
Other direct costs	13.0	22.5	27.9	10.7	32.5	32.5	32.5
Labour (paid)	61.6	18.9	71.6	9.9	13.0	13.0	13.0
Total variable costs	269.1	345.9	425.9	297.8	346.0	346.0	346.0
Machinery	16.1	5.3	15.9	6.9	40.7	40.7	40.7
Depreciation	16.9	56.5	79.7	23.7	22.7	22.7	22.7
Rent	32.6	30.1	82.0	53.9	14.3	14.3	14.3
Interest	0.0	0.0	11.2	0.0	0.0	0.0	0.0
Total fixed costs	65.6	91.9	188.8	84.5	77.6	77.6	77.6
Total costs	334.7	437.8	614.7	382.3	423.7	423.7	423.7
Total unpaid labour (hrs)	49.3	93.9	59.7	148.5	134.0	134.0	134.0
Average hourly wage	5.1	5.4	5.8	5.2	5.4	5.6	5.8
Total unpaid labour	249.9	509.5	348.6	769.7	728.7	753.2	779.7
Total cost including unpaid labour							
Variable cost	494.0	804.4	739.6	990.6	1 001.9	1 024.0	1 047.8
Fixed cost	90.6	142.8	223.7	161.5	150.5	152.9	155.6
Total cost	584.6	947.3	963.3	1 152.0	1 152.3	1 176.9	1 203.4

Source: 2000–2004 FADN, 2005 and 2006 based on LMC questionnaire responses.

Table A6.9: Average sunflower production costs Spain, FADN Definition (€/hectare)

	2000	2001	2002	2003	2004	2005 (e)	2006 (e)
Seed	31.1	41.2	66.3	65.3	55.1	55.1	55.1
Fertiliser	18.0	59.8	61.3	25.8	51.7	51.7	51.7
Crop protection	7.8	28.7	35.3	39.4	26.3	26.3	26.3
Other specific costs	2.2	0.3	0.0	2.2	0.0	0.0	0.0
Energy and Fuel	40.3	40.0	55.0	28.6	30.5	30.5	30.5
Contracted labour/services	21.0	13.3	26.0	63.6	58.7	58.7	58.7
Water/irrigation	0.1	13.7	15.3	3.1	0.2	0.2	0.2
Other direct costs	6.3	16.4	27.4	54.0	44.5	44.5	44.5
Labour (paid)	3.8	26.5	20.7	23.3	50.1	50.1	50.1
Total variable costs	130.5	239.9	307.2	305.4	317.1	317.1	317.1
Machinery	8.9	12.4	16.0	16.3	18.3	18.3	18.3
Depreciation	21.7	24.3	37.6	13.8	22.8	22.8	22.8
Rent	9.1	11.2	10.6	65.3	48.6	48.6	48.6
Interest	0.0	0.0	1.1	7.2	0.5	0.5	0.5
Total fixed costs	39.8	47.9	65.4	102.7	90.3	90.3	90.3
Total costs	170.2	287.8	372.6	408.0	407.4	407.4	407.4
Total unpaid labour (hrs)	40.6	45.3	40.4	75.5	59.8	59.8	59.8
Average hourly wage	5.1	5.4	5.8	5.2	5.4	5.6	5.8
Total unpaid labour	206.0	245.7	236.0	391.5	325.4	336.3	348.2
Total cost including unpaid labour							
Variable cost	315.9	461.0	519.6	657.7	609.9	619.8	630.5
Fixed cost	60.4	72.5	89.0	141.8	122.8	123.9	125.1
Total cost	376.2	533.5	608.6	799.5	732.8	743.7	755.6

Source: 2000–2004 FADN, 2005 and 2006 based on LMC questionnaire responses

Table A6.10: Average Maize Production Costs Spain, FADN Definition (€/hectare)

	2000	2001	2002	2003	2004	2005 (e)	2006 (e)
Seed	125.4	155.1	155.5	223.7	189.6	189.6	189.6
Fertiliser	99.5	214.7	264.9	179.4	199.7	199.7	199.7
Crop Protection	36.0	114.2	99.7	103.4	59.4	59.4	59.4
Other Specific Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Energy and fuel	35.4	68.7	76.3	48.4	102.0	102.0	102.0
Contracted labour/services	143.2	45.8	62.7	169.8	214.5	214.5	214.5
Water/irrigation	32.0	78.5	54.5	102.7	171.7	171.7	171.7
Other direct costs	25.5	30.2	34.0	156.8	130.4	130.4	130.4
Labour (paid)	31.9	84.4	99.7	165.3	117.8	117.8	117.8
Total variable costs	528.9	791.7	847.1	1 149.5	1 185.2	1 185.2	1 185.2
Machinery	1.2	43.9	70.8	60.8	64.3	64.3	64.3
Depreciation	140.7	82.0	67.3	60.1	76.7	76.7	76.7
Rent	213.7	15.5	16.5	74.3	227.6	227.6	227.6
Interest	4.5	1.0	0.0	0.0	15.0	15.0	15.0
Total fixed costs	360.1	142.5	154.6	195.3	383.7	383.7	383.7
Total costs	889.0	934.2	1 001.8	1 344.8	1 568.8	1 568.8	1 568.8
Total unpaid labour (hrs)	60.1	119.1	113.8	159.9	103.0	103.0	103.0
Average hourly wage	5.1	5.4	5.8	5.2	5.4	5.6	5.8
Total unpaid labour	304.5	646.1	664.1	829.0	560.4	579.3	599.6
Total cost including unpaid labour							
Variable cost	803.0	1 373.3	1 444.8	1 895.6	1 689.5	1 706.5	1 724.8
Fixed cost	390.5	207.1	221.0	278.2	439.7	441.6	443.6
Total cost	1 193.5	1 580.3	1 665.8	2 173.8	2 129.2	2 148.1	2 168.5

Source: 2000–2004 FADN, 2005 and 2006 based on LMC questionnaire responses.

Table A6.11: Spain – the decision whether or not to harvest cotton

	Cotton	Cotton (agri-environ. payments)	Cotton (no agri-environ. payments)	Cotton (low input-low yield)
Agri-environment payment	No	Yes	No	No
Supplementary payment	Yes	Yes	Yes	No
Harvest cotton				
Derived yield (tonnes/ha)	4.13	2.56	2.56	1.00
Payments				
Agri-environment payment (€/ha)	0	350	0	0
Additional payment (€/ha)	191	191	191	0
Gross margin (€/ha)	505	878	528	450
Not harvest cotton				
Revenue forgone				
Sales price (per tonne)	244	244	244	244
Sales price (per hectare)	1008	626	626	244
Costs foregone				
Harvesting (per hectare)	255	255	255	255
Transport (per tonne)	20	20	20	20
Transport (per hectare)	83	51	51	20
Gross margin (€/ha)	-165	558	208	481

Source: LMC.

Table A6.12: Returns to cotton and alternative crops (€ per hectare)

COTTON	Average (2001 – 2005)		
	Macedonia-Thraki	Thessalia/Sterea	Spain
Price per tonne (€/t)	818.4	845.9	940.9
Yield (t/ha, unginned)	3.2	3.5	3.7
Total revenue	2 568.8	2 973.8	3 435.5
Gross margin (excluding family labour)	1 436.1	1 919.4	1 958.2
Return to family labour (per hour)	6.7	8.5	14.1
Gross margin (including family labour)	907.10	1 331.1	1 209.1
Total profit (excluding family labour)	574.30	1 250.4	1 577.8
Return to family labour (per hour)	2.70	5.50	11.20
Total profit (including family labour)	-13.50	596.80	745.50

DURUM WHEAT	Average (2001 – 2005)		
	Makedonia-Thraki	Thessalia/Stereia	Spain
Income per tonne (€/t)	144.7	148.8	140.4
Coupled payment (€/ha)	152.1	152.1	239.4
Durum wheat zone supplement (€/ha)	341	341	247.7
Yield (t/ha)	2.8	3.8	3.4
Total revenue	905.1	1 052.6	969.6
Gross margin (excluding family labour)	546.8	680.1	617.3
Return to family labour (per hour)	6.8	6.8	5.9
Gross margin (including family labour)	253.4	419.2	57.5
Total profit (excluding family labour)	340.6	439.3	513.2
Return to family labour (per hour)	4.2	4.4	4.7
Total profit (including family labour)	609.1	147.9	-108.7

MAIZE	Average (2001 – 2005)		
	Makedonia-Thraki	Thessalia/Stereia	Spain
Income per tonne (€/t)	142	148.9	132.5
Coupled payment (€/ha)	540.5	540.5	398.4
Yield (t/ha)	11.9	11.9	11.7
Total revenue	2 306.2	2 306.2	1 944.9
Gross margin (excluding family labour)	1 307.9	1 371.8	913.20
Return to family labour (per hour)	6.60	6.90	7.90
Gross margin (including family labour)	810.60	1 158.2	323.00
Total profit (excluding family labour)	732.60	1 371.8	661.30
Return to family labour (per hour)	3.7	6.9	5.7
Total profit (including family labour)	177.4	633.4	5.5

SUNFLOWERS	Average (2001 – 2005)		
	Makedonia-Thraki	Thessalia/Stereia	Spain
Income per tonne (€/t)	–	–	241
Coupled payment (€/ha)	–	–	239.4
Yield (t/ha)	–	–	2.2
Total revenue	–	–	779.9
Gross margin (excluding family labour)	–	–	482.5
Return to family labour (per hour)	–	–	9
Gross margin (including family labour)	–	–	206.2
Total profit (excluding family labour)	–	–	403.2
Return to family labour (per hour)	–	–	7.6
Total profit (including family labour)	–	–	96.2

A6.3 Change in costs following the change in regime

On the basis of the data on the inputs used resulting from the survey carried out by LMC, the costs of production for 2005 and 2006 have been estimated.

As regards family labour time spent on cotton, most of the respondents reported that it remained unchanged between 2005 and 2006. Paid labour fell while contracted labour rose (Table A6.13).

Table A6.13: Days per hectare spent on cotton production, Greece

Labour	2006	2005	Change
<i>Household</i>	10	10	0%
<i>Paid</i>	4	4	-3%
<i>Contracted</i>	3	3	6%

Source: LMC Questionnaire, from a sample of 200 cotton growers

The rather stable input use reported in Greece confirms other information that the drop in yields occurred in 2006 was mainly due to adverse weather conditions.

In contrast, the drop in yield in **Spain** is more to be attributed to a significant reduction of the input use, as it emerges from the LMC's survey. Inputs were found to be lower for fertiliser, pesticides and labour (Table 2.19 and Diagram 2.20).

Family labour was reported to be virtually unchanged between 2005 and 2006, while paid and contracted labour decreased (Table A6.14).

Table A6.14: Days spent on cotton production per hectare

Labour	2005	2006	Change
<i>Household</i>	4.40	4.48	2%
<i>Paid</i>	1.03	0.80	-22%
<i>Contracted</i>	0.74	0.58	-22%

Source: Questionnaire LMC.

ANNEX 7 – ECONOMICS OF THE GINNING INDUSTRY

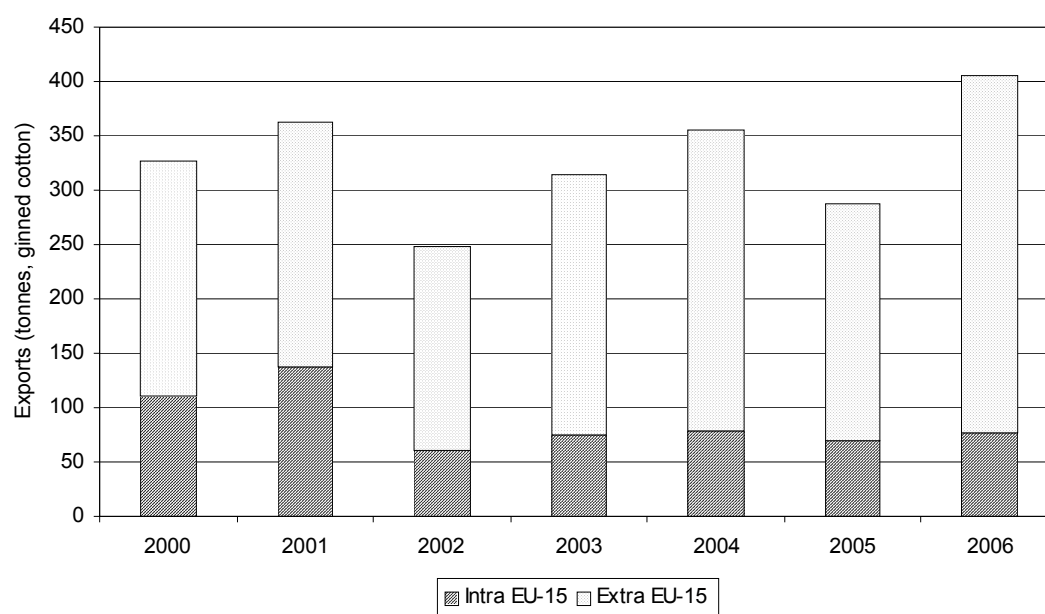
A7.1 The role of the ginner

The ginner purchases unginning cotton from farmers and processes it into ginned cotton and cottonseed. Purchases are on an outright basis. There is no tolling of unginning cotton for farmers. Responses to the questionnaire revealed that purchases are made on a spot rather than forward basis. There are very few ginner who have contracts with individual growers. From the gins interviewed, 16% marketed all their cotton themselves, 33% used a marketer/trader, while 50% used both.

Over the past five years, the volume of sales to EU–15 member states has fallen as the European textile industry has steadily declined. Ginner in Greece and Spain have had to look increasingly outside the Community for markets. Over the last five years, exports accounted for 72% of production in Greece and 45% of production in Spain.

Greek exports are dominated by exports to Turkey and North Africa. In Spain, EU–15 exports were the most important until 2006 (Table A7.1).

Diagram A7.1: EU–15 Cotton ginned exports

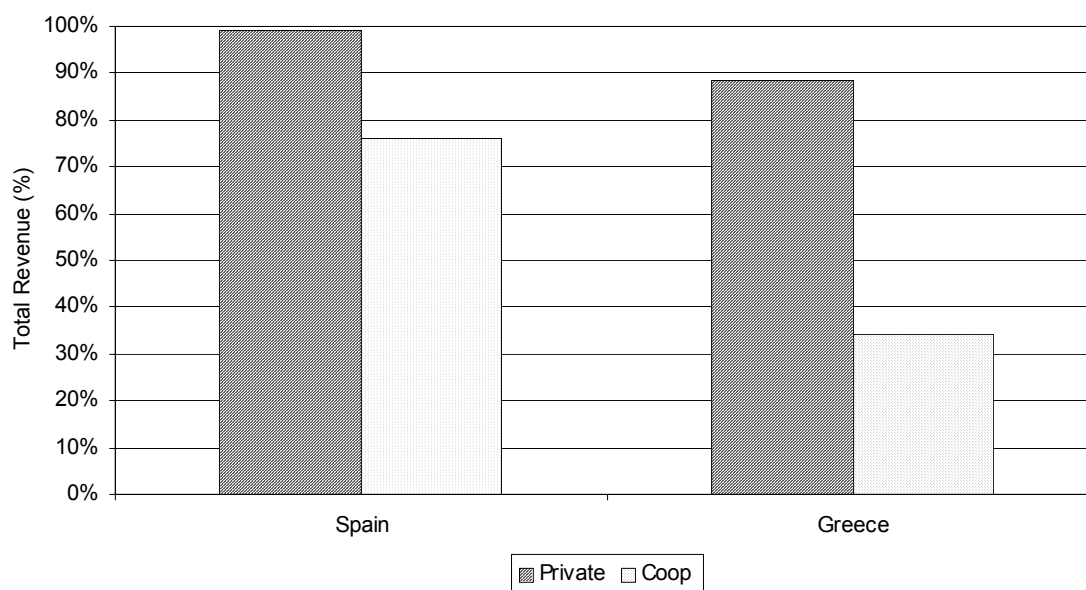


Source: Eurostat

All but one of the Greek ginner interviewed belonged to an inter-branch organisation. These were thought to be useful for solving problems in the sector and for improving quality. All ginner purchased cotton only from other members of the inter-branch organisation. The Spanish experience of inter-branch organisations is more mixed.

Among the companies interviewed, ginning activities accounted for 82% of total revenues in Greece and 87% of revenues in Spain. Cooperative ginning operations also have interests in input distribution and the contracting of services; hence their revenues from ginning alone was lower (Diagram A7.2). In Greece, within the cotton-related activities, a number of companies also crushed cottonseed into oil and cake. Non-cotton activities were linked to the warehousing and storage of other commodities.

Diagram A7.2: Sources of revenues from ginning activities



Source: LMC

A7.2 Capacity and Capacity Utilisation

Spain

Out of a total of 29 ginning mills, 27 were active in Spain in 2005/06 prior to the reforms, of which 85% were located in Andalusia (mainly in Seville Province) with the remainder located in Cartagena Province, in Murcia (Table A7.1).

Table A7.1: Spain – Location of active ginning mills, 2005/06

Community	Province	No. of mills	% of total
Andalusia	Seville	15	56%
	Cordoba	5	19%
	Cadiz	2	7%
	Jaen	1	4%
Murcia	Cartagena	4	15%
Total		27	100%

Source: LMC, Spanish Ginning Industry Paper

Following the reform, in 2006, six of these gins did not open and one was closed permanently. Of those that opened, many worked only one or two shifts per day, of eight hours per shift.

Capacity levels are difficult to calculate since each factory works for a different number of days and for a different number of hours per day. From the questionnaires, the gins surveyed varied in the number of days operated from 50 to 75 during 2005; the average was 58 days. The number of hours for which each gin operated each day varied between 16 and 24. On the basis of the gins' own data, this resulted in an average capacity utilisation level of 72% in 2005. In 2006, capacity utilisation among the gins we surveyed fell to just 20% and two gins

were closed. The gins that were closed were part of ginning groups operating two or more gins.

In 2004, total employment in the Andalusia cotton-ginning sector was over 1 170 workers, comprising over 250 permanent workers and 920 seasonal workers (equivalent to 11 permanent workers and 40 seasonal workers per mill on average). The provincial distribution of employment reflects the distribution of mills by province (Table A7.2).

Table A7.2: Employment by cotton-ginning sector in Andalusia, 2004

Province	Permanent Workers	Seasonal Workers	Total	% of total
Seville	173	532	705	60%
Cordoba	52	283	335	29%
Cadiz	19	73	92	8%
Jaen	7	32	39	3%
Total	251	920	1 171	100%
Average no. of workers per mill	11	40		

Source: LMC, Diagnostico del Sector Algodonero Andaluz.

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 for exports to Turkey. By 2000, Greek ginners expanded processing capacity to meet the demand for more cotton. 73 ginning mills were active in Greece in 2005/06, of which one third were located in Macedonia, with the remainder mainly located in Thessalia, Central Greece (Sterea – Levadia) and Thrace (Table A7.3). Of the gins in operation, eight are co-operatives, the rest are operated by the private sector.

Table A7.3: Greece – Location of active ginning mills, 2005/2006

	No. of mills	% of total
Macedonia	24	33%
Thessalia	21	29%
Sterea (Levadia area)	20	27%
Thrace	7	10%
Epiros	1	1%
Total	73	100%

Source: LMC.

The Greek ginning sector is undergoing consolidation, with two companies, Karagiorgos Bros. SA and Hellenic Fabrics/Accas Group (the owner of Thrace and Thessalia Ginning Mills) expected to account for around 30% of total cotton production by 2006/07. These two companies rented a number of poor-performing gins in 2006/07 to reduce transportation costs.

As with Spain, capacity utilisation levels are difficult to calculate as each factory works for a different number of days and different number of hours. From the questionnaires, the gins surveyed from 26 to 110 in the number of days operated during 2005; the average was 75 days. The number of hours for which each gin operated each day varied between 8 and 24. If we take the gins' own data of daily processing capacity and multiply it by the number of days worked during 2005 and assume that this is total capacity, then the average capacity utilisation level was 61% in 2005. This over-estimates capacity to the extent that it assumes plants could run for 24 hours a day. In 2006, with lower production, capacity utilisation levels fell among the gins. Using the same approach, capacity utilisation for the companies surveyed fell to 43%.

However, the calculation is not as simple as that. Following the change in regime there were no longer any restrictions on the number of days per season for which a gin could operate. Previously, gins were obliged to operate during a specific period. This was because the Aid was paid to the ginner, and it was felt that by restricting the operation period, inspections could be carried out more easily. Without this restriction, in 2006 the mills were free to operate for a longer number of days. The gins took advantage of this and increased the number of days worked, but reduced the number of hours worked each day. This reduced the need for nightshifts and overtime, thus reducing wage costs.

On average, the number of days worked increased to 81, while the number of hours worked per day fell to 13. In total, the number of hours worked by the plants over the whole season fell by 16% (Table A7.4).

	Days worked		Hours per day	
	Average	Total	Average	Total
2004	73.3	2 493	14.8	459
2005	75.2	2 631	15.5	497
2006	80.5	2 818	12.6	389

Source: LMC.

The average Greek ginning mill employs 10 permanent and 30 seasonal workers; this suggests that total employment in the Greek ginning sector is around 3 200 workers.

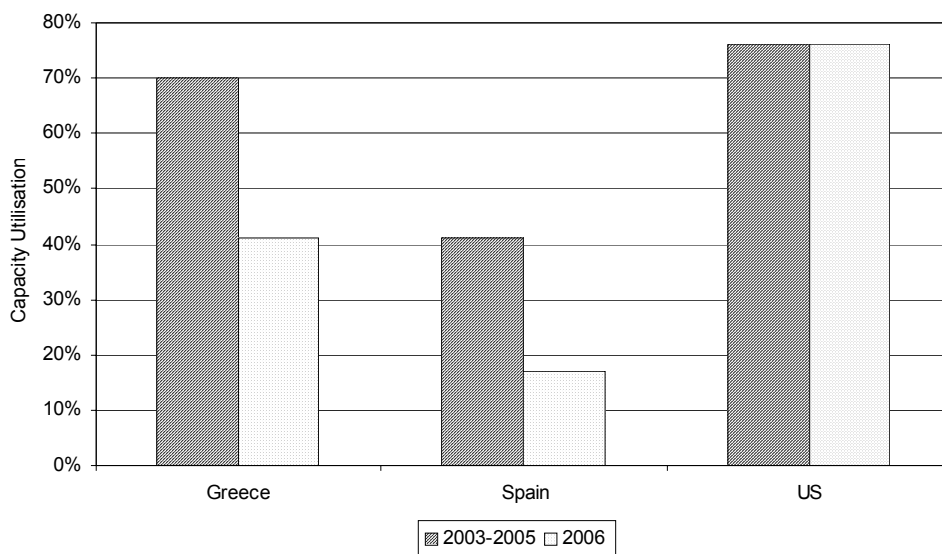
Benchmarking

On an industry-wide basis, to derive an objective measure of capacity, we have calculated capacity on the basis of US industry parameters. In the US there is, on average, an 81 day season based on two shifts (average operating time was 17.5 hours). We have recomputed the EU daily capacity numbers using data from ginning companies, adjusted to allow for two shifts. Where we have no capacity data (5 companies out of 27 in Spain and 10 out of 50 in Greece), we have estimated capacity as the average capacity of the companies from which we have data. This puts total ginning capacity at 0.86 million tonnes of unginning cotton in Spain and 1.60 million tonnes of unginning cotton in Greece.

On this basis, the capacity utilisation level for the whole industry in Greece is estimated to have averaged 70% in 2003–05 and to have fallen to 56% in 2006, while in Spain capacity

utilisation is estimated to have been 41% in 2003–2005, falling to 17% in 2006. In the US capacity utilisation is estimated around 75% (Diagram A7.3).

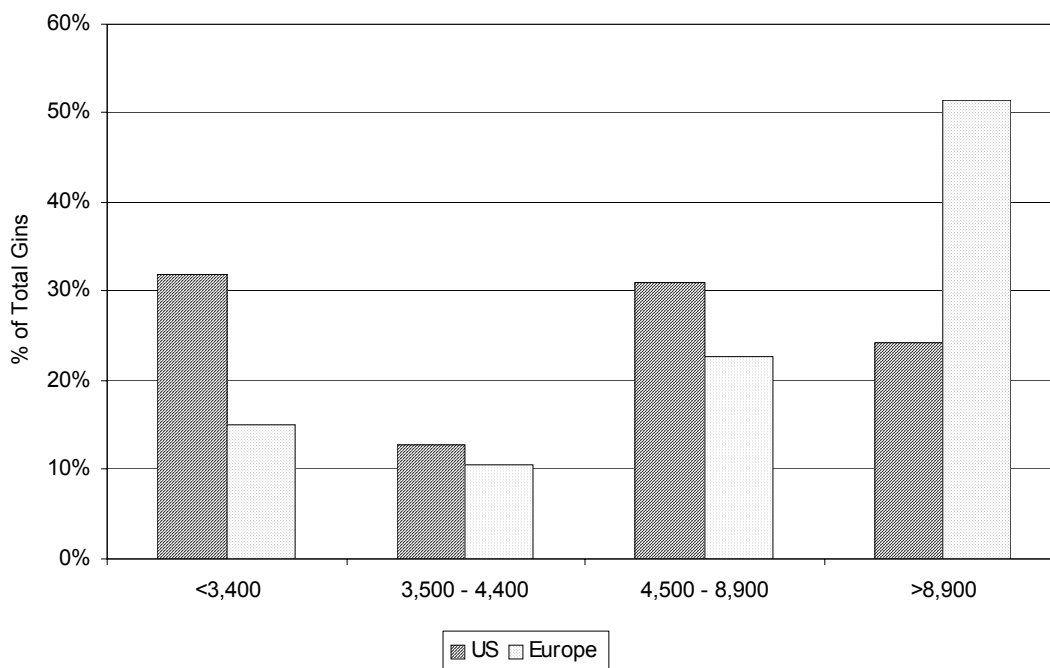
Diagram A7.3: Average US and EU gin capacity utilisation, 2003–2005 vs. 2006



Source: Industry Interviews, LMC estimates

The average gin capacity in the EU is much larger than in the US (Diagram A7.4). In the EU, about half of the gins have over 9 000 tonnes of annual capacity, with several rated at 22 000 tonnes. By contrast, only 25% of US gins are rated at over 9 000 tonnes of ginned cotton, and very few of these have 22 000 tonnes capacity.

Diagram A7.4: Comparison of US and EU gin capacity by size of gin



Source: Industry Interviews, USDA, LMC estimates

Ginning Production Costs

From the questionnaires we are able to gain an impression of ginning costs and how these have changed.

Greece

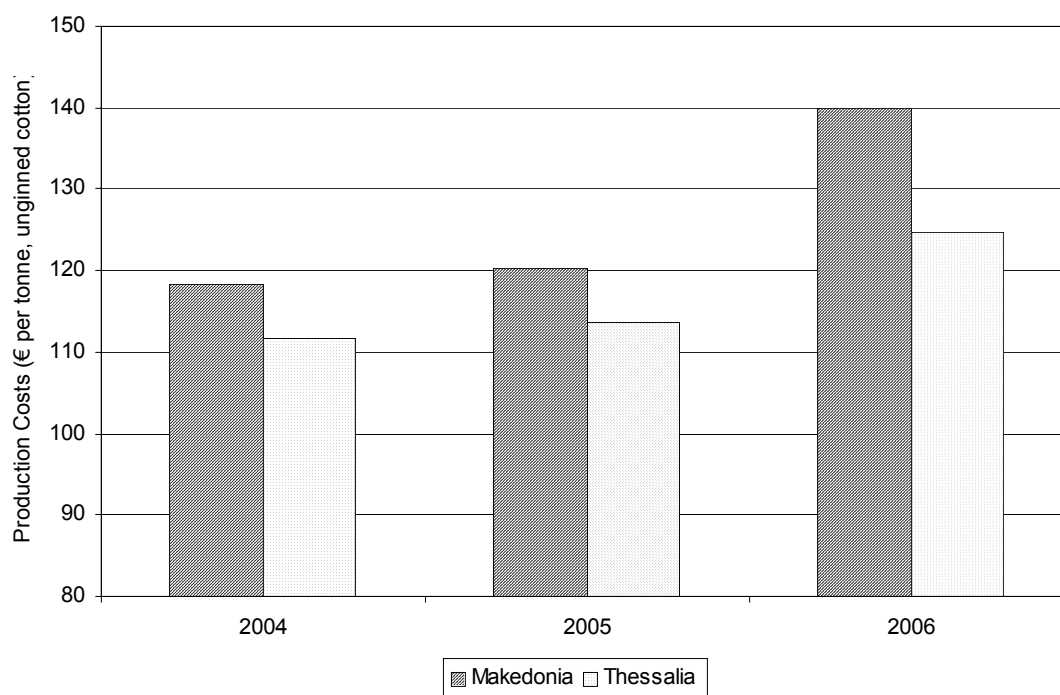
From the questionnaire respondents, Greek ginning costs averaged €118 per tonne of unginning cotton in 2004 and 2005 and rose to €135 per tonne in 2006. Fixed costs accounted for 37% of total costs, rising to 39% in 2006 (Table A7.5). Costs are higher in Macedonia than in Thessalia (Diagram A7.5).

Table A7.5: Average Greek ginning costs, 2004–2006 (€ per tonne, unginning cotton)

	Ginning	Storage	Sales/marketing/ transport	Fixed costs	Other	Total costs
2004	44	8	9	44	13	117
2005	45	9	9	43	12	119
2006	50	10	10	53	12	135

Source: LMC.

Diagram A7.5: Ginning costs, Macedonia vs. Thessaly



Source: Questionnaire and LMC estimations

With the fall in capacity utilisation, variable costs rose by 9% between 2005 and 2006, while fixed costs rose by 23%. The rise in costs would have been greater but for ginners' efforts to reduce costs, such as changing shift patterns. With shorter shifts, the level of unskilled labour employed in the gins fell by 15% in 2006. Skilled labour employment was unchanged (Table A.7.6).

Table A7.6: Gin employment levels among Greek questionnaire respondents
(persons)

	Total employment	Skilled (ginning)	Skilled year round	Unskilled
2004	94	26	20	49
2005	90	24	19	47
2006	82	23	19	40

Source: LMC.

Spain

In Spain, there was a wide range of reported costs, and the size of the ginning operation does not seem to have influenced the costs significantly. Among the questionnaire respondents, ginning costs averaged €100 per tonne of unginning cotton in 2004 and 2005 and rose to €149 per tonne in 2006.

Fixed costs accounted for 50% of total costs rising to 55% in 2006 with the lower level of capacity utilisation (Table A7.7).

Table A7.7: Average Spanish ginning costs, 2004–2006 (€ per tonne, unginning cotton)

	2004	2005	2006
Total cost	99	102	149
Variable	49	54	67
Fixed	50	49	82
Fixed % of total	50%	47%	55%

Source: LMC.

With the fall in capacity utilisation, variable costs rose by 24% between 2005 and 2006, while fixed costs rose by 69%. In order to reduce costs (both fixed and variable), the levels of employment fell significantly in 2006. Casual workers and skilled staff linked directly to the ginning operation were the major losers. Permanent staff were largely unaffected as ginners sought to continue their operations and continue to provide a range of services (Table A7.8). Discussions with ginners suggest that this trend will continue in 2007, but that by 2008 the number of permanent staff, too, will begin to decline if capacity utilisation levels do not rise.

Table A7.8: Gin employment levels among Spanish questionnaire respondents
(persons)

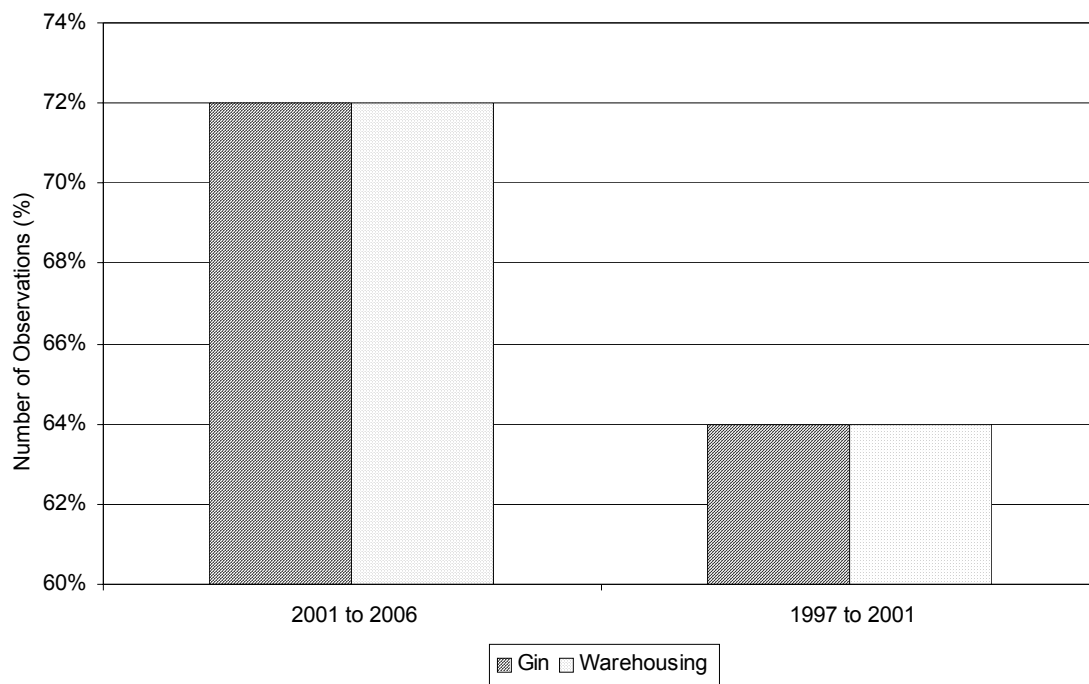
	Total employment	Skilled (ginning)	Skilled year round	Unskilled
2004	276	155	71	89
2005	270	142	71	82
2006	216	95	74	47

Source: LMC.

Investment

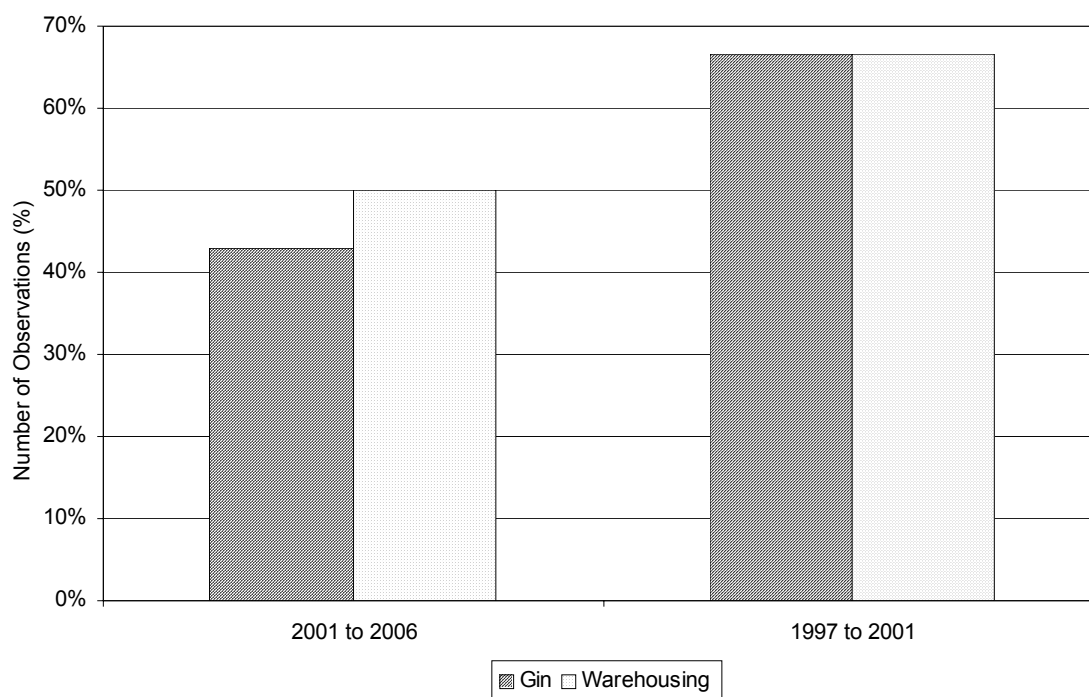
Capital investment in the gins varies considerably between years. When asked how investment in the ginning operation and warehousing had changed over the last five years, in Greece 72% of the respondents reported that investment had increased over the last five years. This increase was largely in increasing the capacity of ginning operations and improving ginning machinery to increase the quality of production.

Diagram A7.6: Proportion of Greek gins reporting an increase in investment in 1997–2001 and in 2001–2006



Source: LMC estimates.

Diagram A7.7: Proportion of Spanish gins reporting an increase in investment in 1997–2001 and in 2001–2006



Source: LMC.

In Spain, fewer than 50% of the respondents reported an increase in investment. In the rest of cases, investment was unchanged from previous years. Investment in warehousing capacity was also greater in Greece than Spain (Diagrams A7.6 and A7.7).

ANNEX 8 – ENVIRONMENTAL IMPACTS

Table A8.1: Evolution of input use in cotton sector in Greece (2000/2005)

	Fertilisers (kg/ha)	Pesticides, insecticides and fungicides (kg/ha)	Herbicides (kg/ha)	Irrigation (m3/ha)
Increase	48%	50%	49%	31%
No Change	29%	36%	43%	59%
Decrease	22%	14%	8%	10%

Source: Alliance Environnement.

Table A8.1 presents the evolution of input use in the cotton sector in Greece from 2000 to 2005. Between 2000 and 2005 the change in input use in Spain has been insignificant. None of the small holdings (below 10 ha) changed its practices, for holdings between 10 and 20 ha the majority (75~87%) of holdings showed no changes and for the holdings above 20 ha as much as 87~95% of holdings did not change their practice. In the medium-sized holdings, the trend was to reduce the input use and the use of phytosanitary products (Table A8.2)

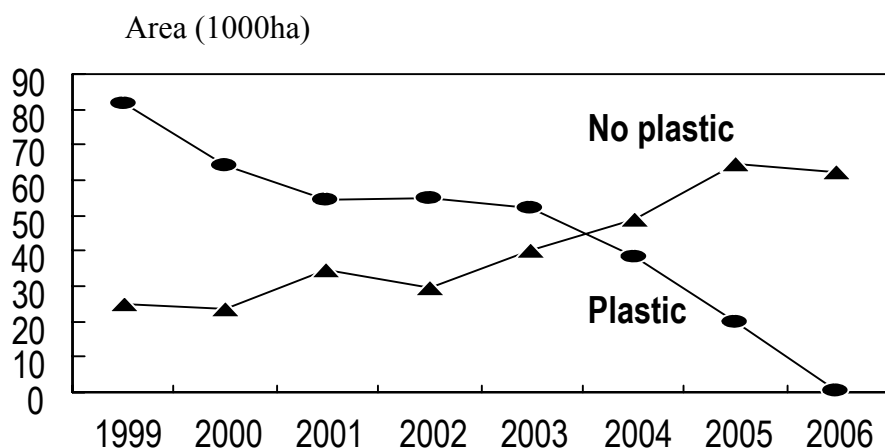
Table A8.2: Evolution of input use in cotton sector in Spain (2000/2005)

Farm size	Evolution	Fertilisers (kg/ha)	Pesticides, insecticides and fungicides (kg/ha)	Herbicides (kg/ha)	Irrigation (m3/ha)
< 10 ha	No change	100%	100%	100%	100%
	Decrease	25%	16%	8%	8%
	No change	70%	76%	87%	87%
10 – 20 ha	Increase	5%	8%	5%	5%
	Decrease	0%	5%	0%	0%
	No change	95%	87%	95%	95%
> 20 ha	Increase	5%	8%	5%	5%

Source: Alliance Environnement.

The use of plastic in cotton production has been declining steadily since 2000, especially in Spain (Diagram A8.1). In Greece traditionally the use of plastic has been much smaller.

Diagram A8.1: Evolution of the use of plastic covers in Spain (1999/2006)

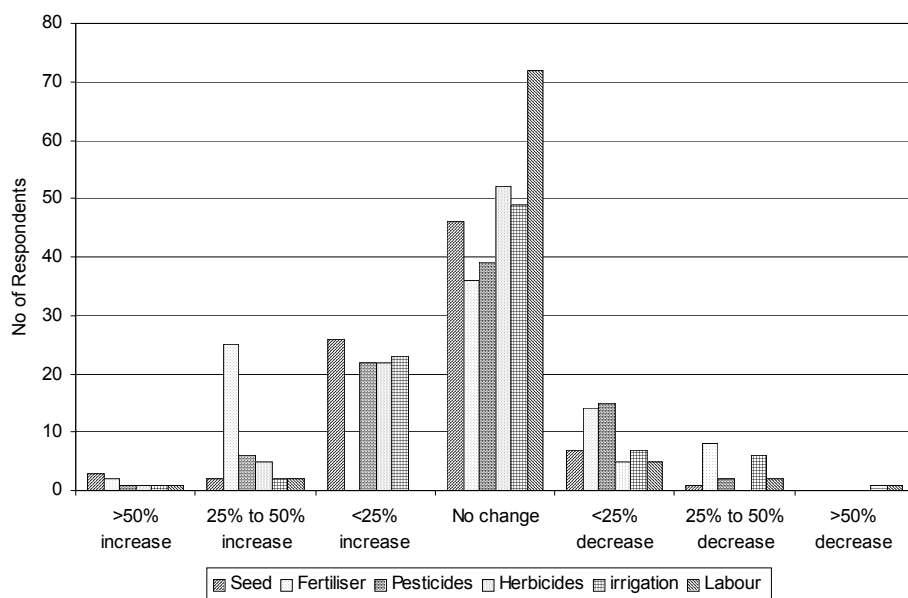


Source : CAPJA

The pollution of water is identified as the biggest problem, an evidence of this is the fact that cotton is largely grown in areas that have been designated as Nitrate Vulnerable Zone according to the Nitrate Directive. A reduction of irrigation water has been noted in Spain.

Finally, the attractiveness of agri-environmental measures was quite limited under this scenario, as it is evidenced inter alia by the number of participants up to 2005. The high prices implied by this scenario made the respect of the environmental constraints, especially to fertiliser usage, costly for cotton producers. To have the same degree of farmers' participation to the agri-environmental programme, this scenario implies a higher level of agri-environmental payments.

Diagram A8.2: Change in per hectare input use for cotton in Greece, 2005 vs. 2006



Source: LMC

Table A8.4: Change cotton in input use per hectare in Spain, 2005 vs. 2006

Farm size	Evolution	Seed	Fertilisers (kg/ha)	Pesticides, insecticides and fungicides (kg/ha)	Herbicides (kg/ha)	Irrigation (m3/ha)
< 10 ha	Decrease	60%	100%	100%	60%	60%
	No change	40%	0%	0%	40%	40%
10 – 20 ha	Decrease	45%	79%	77%	41%	63%
	No change	45%	9%	11%	50%	27%
	Increase	9%	12%	11%	8%	9%
> 20 ha	Decrease	44%	88%	87%	15%	75%
	No change	56%	9%	12%	85%	21%

Source: LMC.

Comparing the environmental impacts of the integrated production and the most common practices it can be stated that in Spain 40% of small holdings (below 10ha) did not change the use of herbicides and irrigation per ha, whereas a significant percentage indicated a decrease. Regarding the medium-sized holdings (10 to 20 ha) there were different results: 45–50% declared no change concerning the use of herbicides and seeds, while an important percentage indicate a decrease in use of irrigation, pesticides, fertilisers and seeds. As for big holdings (above 20ha) 85% declared no change in herbicides use, whereas 75–88% mentioned a reduction in the use of irrigation water, pesticides and fertilisers.

In addition, cross-compliance rules apply.

Table A8.5: Evolution of irrigated cotton surface in Spain between 2005 and 2006

	2005		2006	
	Area (ha)	%	Area (ha)	%
Irrigated area	82 624	98%	59 380	95%
Non-irrigated area	1 708	2%	3 436	5%
Total area	84 322	100%	62 816	100%

Source: CAPJA.

Agri-environmental measures

Spain

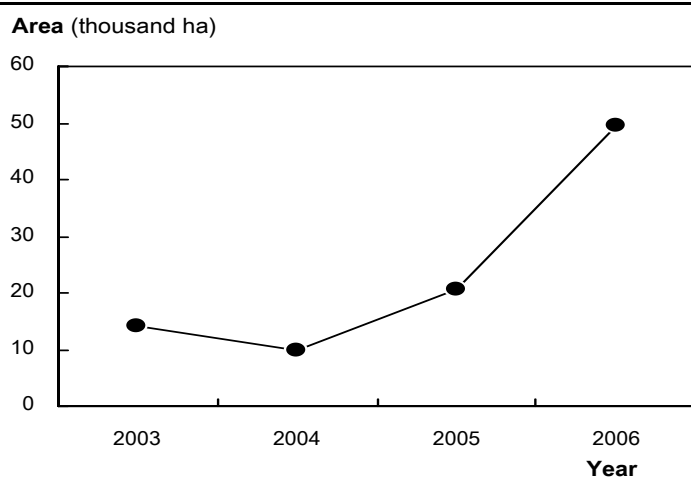
In order to benefit from the integrated production scheme (350€/ha) the farmers were obliged to fulfil several criteria:

- reduction of nitrogen input by at least 20% (with a maximum quantity of 118.3 NFU/ha),
- nitrogen input is forbidden after bolls ripening,
- urea input is forbidden in the second half of the cultivation season,
- reduction in phosphorus and potassium inputs by 20%,

- reduction in the number of phytosanitary treatments (two treatments less for each cultivation cycle in average) and application base pest monitoring,
- elimination of the plastic cover,
- slurries are forbidden,
- spraying pressure for PPP (plant protection products) below 15ka/cm² and PPP is forbidden in unfavourable conditions,
- pest monitoring will be maintained until the end of the vegetative cycle,
- residual herbicides are not permitted either in autumn or on sandy land.

Since the beginning of 2006 this programme was very successful in Spain and the areas under it grew rapidly (Diagram 8.4).

Diagram A8.4: Participation in the agri-environmental programme in Spain (2003/2006)



Greece

The amount of aid for Thessalia ranges from €532–600/ha. The criteria are as follows:

- compulsory set-aside of 25%,
- reduction of nitrogen by 20% in the main crop,
- crop rotation of 25% of the irrigated crops with dry ones,
- obligation to make a soil analysis.

ANNEX 9 – COTTON FIBRE QUALITY

The quality of cotton fibre is determined by a combination of factors, including:

- the variety of cotton;
- agronomic inputs such as fertiliser and irrigation;
- weather factors such as rain at the time of harvest;
- harvest practices such as use of defoliants and use of stripper versus picker machines; and
- ginning practices such as drying temperature and speed of processing.

These various forces affect fibre characteristics, e.g., strength, micronaire (a measure of maturity), fibre length (also called staple length), leaf (a measure of the amount of impurities entrapped among the fibres) and colour (ranging from white to spotted or yellow stained). These quality traits are the basis on which the price of ginned cotton is determined, and on which textile manufacturers decide to purchase particular lots of cotton.

Until the 2006/07 season, Greek and Spanish cotton was considered to have good quality characteristics, with staple (fibre) length of over 28 mm and colour generally below 41 (Table A9.1). Furthermore, in Greece, fibre quality has been improving because of greater penetration of the FiberMax varieties, which have longer fibre and smaller seed. FiberMax varieties now account for about 40% of cotton production.

Following the reform, the quality of ginned cotton from the 2006 crop deteriorated compared to previous years in both Greece and Spain. Some diminution of quality was a result of weather in Greece, but the greatest impact came as a result of poorer farm management. This is perceived by ginners to be the result of the requirement that the coupled payment is made on boll opening rather than harvest. Lower fertiliser and irrigation use in Spain resulted in shorter fibre length. In addition, farmers did not defoliate (the application of a chemical to cause the leaves to fall off) before harvesting, which increased the amount of leaf impurities in the unginned cotton.

In Greece, the fibre length, fibre strength and colour were reported to be of worse quality in 2006, than they had been five years earlier.

Table A9.1: Reported Greek cotton quality, 2006 vs. 2001–2005 (modal response)

	Fibre length	Fibre strength	Micronaire	Colour
Past five years	28.50	29.00	4.05	41
2006	27.50	27.50	4.15	51

Source: LMC.

In Spain, individual quality characteristics were reported by two ginners (Table A9.2). In these cases, the fibre length, fibre strength and micronaire were all said to be of a lower quality in 2006 than it had been in 2005.

Table A9.2: Reported Spanish cotton quality, 2006 vs. 2005

	Fibre length	Fibre strength	Micronaire	Colour
2005	27–28.5	28.9	2.9–4.2	Strict middling – middling
2006	28–28.8	30–30.5	3.7–4.4	Middling – barely middling

Source: LMC.

Another factor that has acted to reduce the quality of both Greek and Spanish cotton, but which is not related to the new regime, is the increasing use of stripper harvesters. The type of cotton varieties grown in both countries is the picker type, with more open bolls, that allows a spindle harvester to be used. The spindle harvester is gentler than stripper harvesters in handling the plant and the bolls, so that few impurities are incorporated into the unginned cotton. However, spindle harvesters are slow and very expensive, and are being replaced by stripper harvesters, which are faster and more affordable, but, because they literally beat the entire plant in the process of harvesting, far more plant matter – sticks, leaves, etc. – are brought into the gin along with the unginned cotton.

The reduced quality of Greek and Spanish cotton has affected the potential export market for ginned cotton. Textile factories in Turkey, which has become the key trading partner for Greece's cotton, need relatively low grade cotton. Therefore, the lower quality of the 2006 cotton is believed to have had only slight impact on Greek exports to its neighbour. However, it has affected trade with the Far East, which requires higher qualities. Spain's trade with the Far East is reported to have fallen sharply in 2007, and it substituted that amount with trade to Turkey, with whom Spain does not traditionally trade large volumes of cotton.

ANNEX 10 – BUDGET EXPENDITURE

Under the old regime, expenditure on cotton aid had a floor of €770 million, and 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 during 2005 (Table A10.1, Table A10.2).

Table A10.1: European Commission expenditure on cotton aid (€ million)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Advance/balances for previous years	-4.5	0.2	-0.3	-0.3	-11.6	1.0	-0.1	0.5	2.9	0.0	0.0
Advances		575.8	4.2	23.6	12.3	17.3	1.0	1.7	0.0	2.1	0.0
Balances	744.2	88.9	601.7	556.9	678.5	622.3	542.1	567.5	653.5	637.8	726.2
Total Greece	739.7	664.9	605.6	580.3	679.2	640.6	543.0	569.7	656.4	639.9	726.2
Advance/balances for previous years	0.0	0.0	0.0	0.0	0.4	0.0	-0.1	0.0	0.2	0.0	0.0
Advances		44.5	189.7	108.8	195.2	196.7	157.0	215.5	201.5	163.7	211.4
Balances	57.6	30.6	4.7	71.9	28.3	17.3	33.5	18.8	14.5	31.6	14.4
Total Spain	57.6	75.1	194.4	180.7	224.0	214.1	190.4	234.4	216.2	195.3	225.8
Total	797.2	740.0	800.0	761.0	903.2	854.7	733.4	804.0	872.6	835.2	952.0

Source: DG AGRI.

Table A10.2: EU expenditure on cotton aid (€ million)

	Greece		Spain		Total
Production aid 2000–2005 (Option 1)		629.3		212.7	842
Current regime 2006 (Option 2)	➤ Decoupled	367.5	➤ Decoupled	134.3	803.1 ^(*)
	➤ Coupled	202.2	➤ Coupled	72.7	
	➤ Rural Dev.	17.9	➤ Rural Dev	4.1	
	➤ Interprof. org.	3.7	➤ Interprof. org.	0.7	
		591.3		211.8	
Full decoupling (Option 3)	➤ Decoupled	573.4	➤ Decoupled	207.7	803.1
	➤ Rural Dev.	17.9	➤ Rural Dev.	4.1	
		591.3		211.8	

(*) Reference period 2000–2002

Source: DG AGRI.

Under the reformed regime, 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).

Initially the Commission proposed that, of this budget, €103 million would be spent on rural development programmes, €418 million on decoupled aid and €278 million on coupled aid.

The basis for this split was that the average aid to the growers (decoupled plus coupled) should equal the average aid actually paid during the reference period less the amount paid to the ginners (i.e., the difference between the guide price and the minimum price) less a balancing adjustment for the difference between the average world price on which the aid applications were fixed and the average actual world price over the same period. However, the final Council decision increased the proportion of decoupled aid at the expense of the rural development funds.

ANNEX 11 – ASSESSMENT OF ADMINISTRATIVE COSTS

Table A11.1: List of measures currently entailing administrative costs

OPTION 1

Information to be notified or tasks to be fulfilled	Producers	Ginners	Member States	Commission	Timing / Frequency	Compulsory / Optional
Quality of unginned cotton		X			every delivery	O
World market price of unginned cotton				X	every 10 days	C
World market price of ginned cotton				X	every day	C
Determination of estimated unginned production			X	X	twice a year	C
Determination of actual unginned production			X	X	once a year	C
Reduction of guide price				X	three times a year	C
weighted average of unginned world market price				X	once a year	C
Total budget expenditures				X	once a year	C
Calculating and fixing aid				X	once a year	C
Determination of the total eligible quantity				X	once a year	C
Aid application		X			every delivery	C
Security referred to aid application		X			every delivery	C
Application of supervised storage		X			every delivery	C
Notification of quantity of ginned cotton		X			once a year	C
Granting advances on the aid			X		every aid application	C
Establishing security for advance on the aid		X			every delivery	C
Provisional reduction of the guide price				X	twice a year	C
Payment of advance on minimum price		X			twice a year	C
Application for area aid provided under IACS	X				once a year	C

Submission of contracts		X		several times a year	C
Stock records		X		continuous process	C
Checks:					
– declaration of areas sown (spot-check 5%)			X	once a year	C
– contracts			X	once a year	C
– balance between unginned and ginned cotton			X	once a year	C
– final quantity of ginned cotton			X	once a year	C
– stock records provided by ginners			X	once a year	C
– cross-checks between areas sown and areas under contracts			X	once a year	C
Penalty scheme			X	once a year	C
Communications for implementation of Regulation (EC) No 1591/2001 (Article 15)			X	several times a year	C
Report on environmental situation:			X	before end 2004	C
– determine actions in favour of the environment (environmentally friendly practices)			X	before end 2004	
– research & development of environmentally friendly practices			X	before end 2004	
– diffusion of results to producers			X	before end 2004	
– respect environmental legislation			X	before end 2004	

OPTION 2

Information to be notified or tasks to be fulfilled	Producers/ Inter-branch organisations	Member States	Commission	Timing/ Frequency	Compulsory/ Optional
Establishing objective criteria for approval of eligible areas		X		once	C
Authorisation of varieties for sowing		X		once	C
Fixing the minimum plant density		X		once	C
Agronomic practices		X			O
Calculating the amount of aid per eligible hectare and estimation of eligible area		X		once per year	C
Authorisation of inter-branch organisations		X		once per year	C
Operating rules for inter-branch organisations	X				C
Aid differentiation (scale)	X				O
Classification of cotton parcels for the scale	X				O
Communications to the producers and Commission (approved varieties, criteria for approving land, agronomic practices)		X		once per year	C

OPTION 3

Information to be notified or tasks to be fulfilled	Producers/ Inter-branch organisations	Member States	Commission	Timing/ Frequency	Compulsory/ Optional
Calculating the amount of producer's entitlement to aid		X		once	C
Aid application	X				
Cross-compliance:					
– Annex IV of Regulation (EC) No 1782/2003		X			C
– Good agronomic practices		X			C
Administrative controls:					
– cross-check		X			C
– spot-check		X			C

ANNEX 12 – REPLY TO IMPACT ASSESSMENT BOARD

Modifications in response to the Impact Assessment Board comments

Comment 1 *"The report should describe **more clearly the problems**, relevant for producers and/or the processing industry, that the reform aims to address; it should present more clearly why a **35%/65% ratio of coupled/decoupled support** was found to meet the objectives of the reform in a better way than any other ratio, and why this ratio respects the principle of proportionality of EU action."*

- **Problem definition**

To explain more clearly the rationale behind the reform of the cotton regime, some changes have been made, in particular to the introduction of Section 2.

This explains the EU's continuing obligation to support cotton production – made when Greece and Spain joined the EC – the subsequent expansion of cotton production in those countries, and the unsustainable growth of the cotton ginning industry.

The reform of the CAP in 2003, introducing a decoupled system of support to most agricultural sectors, highlighted the anomalous situation of the cotton sector. Questions concerning the environmental impact of growing cotton, together with international calls to reduce CAP support for commodities such as cotton, have added to the pressure to reform the cotton regime.

- **The 35% – 65% ratio**

To explain more clearly why this ratio appears the most suitable, some clarifications have been introduced in the following sections:

5.1.3 Economic assessment of the Mainly Decoupled Option (Option 2)

5.1.3.3 Sensitivity analysis of partial coupling. This gives an indication of the likely impact of different levels of coupled payment, i.e. 25%, 30% or 40%.

- ✓ Tables 10 and 11 (p.27-28) and the respective explanations have been modified;
- ✓ Tables 12, 13 and 14 (p.30-31) have been added, together with an explanatory text concerning the return under full decoupling in Spain, Thessaly and Macedonia, respectively.

Comment 2 *"More information should be given on the extent to which **Rural Development measures**, e.g. agri-environmental measures, could alter the presented forecasts of impacts under the different options. To what extent could Rural Development measures help mitigate negative impacts, particularly social/employment impacts, of the preferred option in the regions concerned?"*

In order to show how agri-environmental measures can affect farm incomes and may allow farmers to continue growing cotton, additional elements have been added to the Impact Assessment:

- ✓ Tables 5 and 6 on return to unpaid labour with and without agri-environmental measures.

More emphasis has been given to the role of Rural Development measures in mitigating possible impacts of the reform, in particular in Section 5.3.5 Social Impact and Rural Development.

The Impact Assessment shows that, in the medium term, the reform could have major consequences both on the farmer's choice of crops and on the ginning industry. As agreed by the Council in April 2004, €22 million per year (€154 million for the period 2007–2013) is now available in additional rural development funding for Greece and Spain to spend in the regions concerned.

Comment 3 *The report should present more clearly how the issue of **family/unpaid labour in cotton production** has been taken into account in the analysis under the different options and in the different cotton-producing regions.*

The methodology and results of the two-step analysis provided in Section 5.1 have been clarified.

In addition to the comparison of the gross margin (or profitability) of cotton and the alternative crops, a further analysis was made of the impact of the three options on unpaid family labour. The complete analysis of the close correlation between the gross margin and the return to family labour (Family Farm Income) is now set out in Annex 6 to the Impact Assessment.

Comment 4 *More detailed information should be provided for the **environmental impact of each option**, also in relation to alternative crops production, including quantitative data on water demand and pollution, and soil. The Board invites DG AGRI to draw on specific expertise that is available in DG Environment.*

As suggested by the Board, DG AGRI has drawn on the expertise of DG Environment and introduced additional data, where available. Section 5.2 Environmental impacts, has been enhanced by comments received from stakeholders, experts and DG Environment. In particular, details have been added in Section 5.2.1 concerning:

- ✓ water quantity and quality (in particular with regard to Nitrate Vulnerable Zones under the Nitrate Directive);
- ✓ biodiversity and habitats.

A clearer focus has been brought to Section 5.2.2 Environmental impact of alternative crops.