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Cotton cultivation has long tradition in Greece. The last decade, cotton acreage ranged from 126 000 ha ha to 209 000 ha. Almost all cotton area is irrigated and only a very small percentage, ranging 3-6%, is grown under dry land conditions. Acreage and seedcotton production of the last ten years is shown in Table 1. The objective for the short run is to stabilize cotton production at 150 000-160 000 tons lint, covering the domestic consumption.

Varieties : Upland varieties of *G. hirsutum* are sucessfully grown in Greece. The main cotton varieties, which cover 95% of total acreage, are shown in the table below.

Other cultivated varieties, earlier than the previous, are Skotusa and Samos, which cover 2.9% of the total area. Also Coker and *Acala I.B.* varieties cover 2.1%.

Quality : Grade, length, and micronaire of Greek cotton are shown in Tables 2, 3 and 4.

When mechanical harvesting had increased significantly, cotton lost about half grade in quality. However, the last two years, the percentage of 3 to 4 1/2 grades (GM, SM and MID plus) has been increased due to improved defoliation and ginning. Staple length has gained about one millimeter in a remarkable percentage of the crop recently.

This is mainly due to improvement of the varieties and the cultural techniques.

Micronaire (Table 4) shows no great changes from year to year, although the introduction of Zeta variety (1980), which is not as fine as 4 and Sindos 80, has some influence on the average micronaire each year. Micronaire changes from year to year also reflect the climatic and growth conditions influences on fibre maturity.

Table 1 : Description and percentage of total acreage of greek varieties

Variety	% total acreage	Description
4Σ	38.3	Greek variety, good fiber quality, 28.5 - 29 mm staple length
Zeta	36.5	*Acala* selection *verticillium* tolerant, good fiber quality, 28.5-29mm staple length
Sindos	20.2	Nex Greek variety, good fiber quality, 29 mm staple length

Cotton growing conditions : Cotton is grown between 35°N and 41°N latitude, but only about 1 000 ha (0.5%) are grown lower than 38°N parallel.

In Table 5, one can see the mean air temperature and the precipitation in different cotton growing areas from North to South and West areas. During spring and autumn, the climate is usually not stable and this has great influence on cotton, as both seasons are very critical for the crop (planting-harvesting periods).

Precipitation is very low during the cotton growing period so that irrigation is absolutely needed for productive growth.

The plains where cotton is cultivated have mostly alluvian soil, which is suitable for cotton. The irrigation water comes from rivers by about 46% and from underground water by about 54%. When rainfall during winter of the previous year is limited, shortage of irrigating water is usual, like the years 1977, 1978 and 1985.

The average size of each farm in Greece is small, approximately 3.5 ha, with a variation from 2 ha to 4.5 ha. Land fragmentation is rather extensive, as the mean number of plots per farm is 6.5. After 1981, when mechanical harvesting started to increase rapidly, there is a tendance for an increase of cotton farm size, by renting land, and also of the irrigated cotton acreage.

Production practices

Land preparation : It starts by the end of the previous crop picking in case of cotton, *e.g.* in autumn or early winter, or earlier in case of other crops. It begins with the cutting of the stalks and ploughing to cover plant residues and loosen the soil to a depth of about 20 cm. When the soil moisture conditions permit, during winter, the loosening of the soil surface and destroy of weeds is applied by chisels. In late winter or early spring, disk or tooth harrows are used once or twice to smooth the soil surface, to improve the soil structure, and to cover fertilizer, pesticides, and herbicides. There are sometimes variations in this preparation, according to weather and soil conditions.

Planting : The planting of cotton starts when soil temperature at 5 cm depth is stabilized at 15°. The aim of all producers is to have an early plantation. The planting period lasts about one month, from the beginning to the end of April, according to soil type and area.

The cotton plantation is considered successful and early when emergence of seedlings has been completed by the first days of May. Adverse weather conditions may delay planting or destroy stands. Replanting usually delays the plantation, increases cost and may reduce significantly yields. For planting, four row planters are used, equipped usually with fertilizer and pesticide applier. The distance between rows is 1 m.

The seed is chemically or mechanically delinted.

Plant population after thinning varies from 100,000-200,000 plants/ha, according to variety and other factors, such as earliness of planting, type of soil, etc...

Fertilization : The total irrigated cotton area is fertilized, as cotton responds greatly to nitrogen and phosphate. According to region, earliness of planting, type of soil, plant population, availability of water for irrigation, variety, etc..., the amount of fertilizers vary from 100 kg to 200 kg Nigrogen per ha and 60 kg to 100 kg phosphate per ha. Potash is also used in some cases. Foliar fertilization in combination with insecticides is usual, especially in the early stages of plant growth. In some areas, foliar applications, of manganese once or twice is necessary.

Weed control : Chemical weed control with herbicides is applied to nearly all cotton area. Pre-emergence application of trifluralin (before planting) or prometrin (after planting) is usual.

Mechanical weed control is also necessary and it is applied one to three times.

Irrigation : Nearly all cotton plantations (93-95%) are irrigated in Greece. One to seven water applications are given, and the number of these depends on the climate, the soil type, conditions of the plantations, etc...

The most usual method of irrigation is by sprinklers (about 85% of cotton area). Furrow irrigation is also used. Drop irrigation is tested by the Hellenic Cotton Board, where irrigation water is not enough for cotton and the soil type is light

and sandy. The negative factor in the use of this system is the high cost of equipment.

Crop protection : Cutworms, wireworms, thrips, spider mites, whiteflies, jassids, bollworms and pink bollworms are the insect infestations of cotton in Greece. Bollworm was dangerous only some years, particularly in 1967 and 1983, when the infestation was severe, especially for some regions. Pink bollworm is restricted to the central and south parts of Greece.

At planting time, soil insecticides are used in about 40% of the cotton area. Chemical control of insects (aphids, thrips, worms) is applied when it is necessary. There are traps in cotton plantations for the adult moths of bollworms, and pheronome traps for pink bollworm. Inspection of the plantations by the agronomists of the Hellenic Cotton Board and the growers provides the avoidance of unnecessary sprays and the right application time.

Cotton diseases caused by *Verticillium* wilt, *Alternaria* spp. and bacterial blight create problems.

The last years, *Verticillium dahliae* has contaminated the soil of many areas in the main cotton producing regions causing severe losses. The problem has been overcome, partly, by using tolerant varieties (Zeta), and taking other measures, like crop rotation, dense plant population, etc...

Alternaria causes some problems, especially in stressed plantations, usually in August, by premature leaf shedding.

Bacterial blight is a problem in years with humid summer while it is an almost every year problem in some areas.

When spring is wet and cold, there is infection of the seedlings by *Rizoctonia and Pythium*.

Soil cultivation and late thinning help to reduce losses.

Harvesting : Mechanical harvesting with pickers covers about 70% of total production. Mechanical harvesting has been increased due to the scarcity and high cost of labor during cotton harvesting time. It causes some reduction in average cotton quality if compared with hand picking and additional requirement for defoliation. There are also certain variable cotton losses according to the condition of picking, and some difficulties in the delivering of seedcotton to gins at the peak of harvesting.

Experience and investigation on the above problems gave some solutions and decreased considerably their negative influences.

Source des tableaux 1 a 4 : Hellenic Cotton Board

Crop year	Area ha.	Yield Kg / ha.	Seedcotton production M. tons
1975	136 290	2 700	367 983
1976	148 650	2 289	340 260
1977	182 931	2 461	450 193
1978	168 232	2 681	451 030
1979	136 354	2 348	320 159
1980	141 051	2 503	353 051
1981	126 326	2 840	358 766
1982	137 540	2 296	315 792
1983	168 000	2 396	402 528
1984	192 000	2 356	452 352
1985	209 000	2 487 *	519 783 *

Table 1: Cotton acreage and production in Greece (1975 - 1985)

* not final figure

Grade	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
1. White:													
3-4 1/2	75,90%	74,80%	92,00%	83,70%	79,30%	38,40%	42,20%	71,90%	59,80%	49,20%	64,10%	43,90%	33,30%
5-5 1/2	19,40%	19,70%	7,10%	13,80%	17,40%	44,30%	37,50%	18,80%	30,50%	21,40%	26,40%	39,20%	30,00%
6-8	1,90%	1,90%	0,30%	1,10%	1,10%	4,50%	3,90%	1,60%	2,50%	4,20%	3,50%	6,20%	4,20%
2. L. spotted:													
4-7	2,30%	2,60%	0,40%	1,30%	1,90%	12,00%	14,10%	6,40%	5,80%	14,60%	4,70%	8,30%	21,50%
3. Spotted -Tinget- L. Gray-Gray	0,50%	1,00%	0,20%	0,10%	0,30%	0,80%	2,30%	1,30%	1,40%	10,60%	21,30%	2,40%	11,00%

Grade	1980	1981	1982	1983	1984
1. White:					
3-4 1/2	28,80%	47,30%	25,10%	52,10%	56,10%
5-5 1/2	28,90%	35,20%	25,40%	20,90%	25,40%
6-8	2,80%	1,80%	3,70%	2,90%	1,80%
2. L. spotted:					
4-7	26,70%	13,00%	33,90%	18,10%	13,80%
3. Spotted -Tinget- L. Gray-Gray	12,80%	3,30%	11,90%	6,00%	2,90%

Table 2: Classification of greek cotton (1967 - 1984)
(in bales percent)

Fibre length	19 76		19 77		19 78		19 79		19 80		19 81	
	Bales	%	Bales	%	Bales	%	Bales	%	Bales	%	Bales	%
21 - 24	462	0,09%	5	0,00%	22	0,00%	256	0,06%	156	0,03%		0,00%
25	3 479	0,69%	80	0,01%	1	0,00%	315	0,07%	11	0,00%	94	0,02%
26	19 241	3,81%	688	0,11%	1 625	0,28%	13 750	2,97%	2 115	0,42%	410	0,08%
27	49 009	9,71%	9 961	1,56%	7 185	1,22%	36 605	7,90%	48 966	9,63%	11 869	2,19%
28	282 541	56,00%	434 531	68,06%	452 362	77,09%	310 460	66,97%	266 170	52,35%	333 484	61,40%
29	149 284	29,59%	180 540	28,28%	124 263	21,18%	102 191	22,04%	190 865	37,54%	197 223	36,31%
30	524	0,10%	12 601	1,97%	1 374	0,23%	32	0,01%	112	0,02%	13	0,00%
31	13	0,00%		0,00%		0,00%		0,00%		0,00%		0,00%
Total	504 553	100%	638 406	100%	586 832	100%	463 609	100%	508 395	100%	543 093	100%

Fibre length	19 82		19 83		19 84	
	Bales	%	Bales	%	Bales	%
21 - 24		0,00%	787	0,13%		0,00%
25	185	0,04%	2	0,00%	270	0,04%
26	10 296	2,25%	17 026	2,91%	4 648	0,69%
27	44 244	9,69%	24 273	4,15%	18 345	2,73%
28	241 614	52,92%	253 688	43,39%	478 751	71,34%
29	160 259	35,10%	288 829	49,41%	169 058	25,19%
30	9	0,00%	8	0,00%	3	0,00%
31		0,00%		0,00%		0,00%
Total	456 607	100%	584 613	100%	671 075	100%

Table 3: Cotton staple length of 1976 - 1984 crops

Crop	Thessaly	Central Greece	Macedonia and Thrace	Other areas	Total Greece
1971	3..6	3..7	3..5	—	3..6
1972	4.0	3..9	3..7	—	3..8
1973	3..9	3..9	3..8	—	3..8
1974	3..9	4..1	3..8	—	3..8
1975	3..8	3..9	3..7	3..8	3..7
1976	3..4	3..5	3..3	3..6	3..3
1977	4..3	4..2	3..8	4..2	4.0
1978	3..4	3..6	3..4	3..8	3..5
1979	3..6	3..8	3..6	3..8	3..6
1980	3..7	3..9	3..6	3..8	3..7
1981	3..4	3..5	3..5	3..8	3..5
1982	3..4	3..5	3..5	3..8	3..5
1983	3..8	4..1	3..9	3..7	3..9
1984	3.0	4..1	3..4	3..3	3..2

Table 4: Fibre micronaire of 1971 - 1984 cotton crops

Areas	Jan.	Febr.	March	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
	Mean rainfall in mm.												
Komotini	87.2	51.6	50.0	45.4	55.4	55.9	27..6	17..5	37.0	58.4	84.2	99.5	669.7
Serres	58.7	45.7	43.7	48.3	47.7	59.1	29..4	19..9	26..2	53.8	68.5	71.2	572.2
Sindos	41.1	30.2	38.2	33.6	42.3	34.5	18.0	9..9	28..6	48.8	67;4	58.0	450.6
Thessaloniki	54.2	51.4	50.2	40.8	59.0	41.9	20..5	12..1	33.4	57.2	79.3	55.0	555.0
Gianitsa	67.5	41.5	51.8	51.4	56.2	37.0	24..9	15..3	32.6	65.3	85.9	70.8	600.2
Larisa	48.8	42.8	37.2	37.1	53.1	34.0	23.0	19..1	26..4	98.1	71.7	60.5	551.8
Trikala	93.1	75.6	74.2	57.1	51.8	34.2	14..2	14..2	33.9	95.6	100.0	117.5	761.4
Lamia	69.6	40.7	76.9	28..3	39.6	20..3	18..8	14..8	57.5	81.5	73.8	76.4	598.2
Aliartos	68.9	58.7	89.2	32.6	26..3	22..6	5..7	18..2	44.0	82.5	75.1	117.4	641.2
Arta	144.0	124.0	103.0	76.0	66.0	28.0	10.0	11.0	42.0	147.0	153.9	174.0	1078.0
Mesologi	101.0	82.0	72.0	46.0	38.0	16.0	5..0	6..0	20.0	97.0	122.0	133.0	737.0
	Mean air temperature °C												
Komotini	5..4	5..5	8..2	13..2	18..3	23..2	26..4	25..9	21..2	15..9	11..1	7..5	16..2
Serres	4..1	5..8	9..5	14..6	19..6	24..3	27..1	26..6	20..8	16..1	11..2	5..9	15..5
Sindos	4..6	6..1	9..2	14..2	18..9	24..3	27.0	26..2	21..8	16.0	11..3	6..6	15..5
Thessaloniki	4..4	5..7	8..9	14..2	19..4	24..5	26..9	26..6	21..8	15..9	11..2	6..6	15..5
Gianitsa	3..5	4.0	8..6	13..8	19..2	24..7	26..5	25..8	21.0	15..5	11..3	6..2	14..9
Larisa	5..4	7..1	10..5	14..8	19..4	24..2	27..2	26..8	22..4	16..4	11..3	7..3	16..1
Trikala	5..2	7..4	10..4	15..2	19..8	24..4	27..7	27..3	23..1	17..2	11..5	7..1	16..4
Lamia	7..2	8..2	10..7	15..3	20..3	24..7	27..5	27..7	22..4	17..6	13..7	9..3	17..5
Aliartos	7..4	8..4	11.0	15..2	20..7	24..7	26..8	27.0	22..2	17..5	13..9	9..8	17..1
Arta	9.0	9.0	12.0	15.0	19.0	23.0	27.0	27.0	23.0	18.0	13.0	10.0	17..1
Mesologi	10.0	11.0	13.0	16.0	20.0	24.0	27.0	27.0	24.0	20.0	15.0	12.0	18..3

Table 5: Mean rainfall and air temperature in different cotton producing areas in Greece

Note: Data provided by the Metereological Service and the Ministry of Agriculture