

SOCIO-ECONOMIC ASPECTS OF THE COTTON PRODUCTION IN ANDALUSIA

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As the Common Agricultural Policy moves toward a more market orientated policy, only a few arable crops remain with a production related support regime.

By far, the most important crop under this scheme in South Spain is cotton.

To justify this subsidy it is necessary to explain the socio-economic importance of this crop in areas with an agrarian rent much lower than the European average. In some cases other alternatives to cotton in irrigated lands give a level of profitability that, considering the average farm size, would not allow continuation of farming activities.

Studies on variable costs (especially labour), absolute profitability and opportunity costs are of vital importance in Spain. In the last decades, cotton has been, and still continues to be, a crop of great importance in social and economics terms for some Spanish regions, mainly Andalusia (Valle del Guadalquivir) – producing 80 per cent of the total – Levante (Murcia and Alicante) and Extremadura. This crop has seen a notable evolution in terms of crop regime and farming modernisation. The average hectareage has decreased in Spain, mostly in rainfed lands in favour of irrigated lands. On the other hand, yields have increased strongly, putting Spanish cotton production among the five highest yields in the world. Yet, fibre quality has improved through these years. The harvest mechanisation, warming plastics,

ABSTRACT

The cotton crop has notable importance from a socio-economic point of view for Andalusia, which produces 80 per cent of the total cotton of Spain. It is demonstrated in this paper using data provided by the farmers. We analyse the production by farm size and compare the risk and profitability with other alternative crops of irrigated lands. Also, a comparative study of competitiveness with other world producers is presented. Finally, we provide strengths, weaknesses, threats and opportunities of this crop, and some recommendations to ensure cotton continues playing such a socio-economic role in Andalusia.

RÉSUMÉ

La culture du cotonnière possède une très grande importance socio-économique pour l'Andalousie, productrice de plus du 80% du coton d'Espagne. Dans ce rapport s'exposent des données statistiques, on définit la distribution de la culture par taille des exploitations, s'explique la rentabilité, le risque et la compétitivité de la culture en relation avec d'autres cultures et avec d'autres pays, et conclue avec un bref diagnostic stratégique D.A.F.O. sur l'impact économique, social et agro-industriel de la production du coton en l'économie d'Andalousie et d'autres régions espagnoles.

new chemical (pesticides, herbicides, defoliators and plant regulators) and new farming techniques have achieved an improvement in production and stabilisation of income.

CROP DISTRIBUTION, AGRARIAN EMPLOYMENT AND PRODUCTION

Cotton is the second crop in hectareage (1) (27 per cent of a total of 257,909 hectares of arable crops under irrigation), only surpassed by sunflower (37 per cent). The following crops are wheat (18 per cent), maize (9 per cent) and sugar beet (9 per cent). However, with only approximately one quarter of the

total arable crop under irrigation in Andalusia, the cotton crop accounts for 64 per cent of total labour input in these lands. This represents over a million man-days of labour per year (equivalent to 4,000 permanent jobs). Yet, the cotton crop yields half of the total income from irrigated lands in Andalusia, some 40,000 millions pesetas per year (overall 83,983 millions of pesetas).

FARMER TYPOLOGY

Andalusia (some 89,000 km²) has eight provinces. Seville is the most important producer in terms of number of producers (56 per cent of all producers in Andalusia; 11,369 is the total number of farmers in Andalusia (2) and hectareage (65 per cent; 108,086 hectares in Andalusia). Another 25 per cent in term of both producers and hectareage is located in Cordoba and Cadiz. In these three provinces, the rural unemployment can easily reach 30 per cent. This makes cotton the most relevant crop from the point of view of farm employment among extensive irrigated crops. The average hectareage of cotton producer in Andalusia is 9.5 ha, slightly smaller than in Seville. In Andalusia, farmers with less than 10 hectares produce more than half of the total output, and represent almost 80 per cent of the total number of farmers in South Spain. To point out the small entrepreneur character of the cotton production, more than half of all producers have less

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(1) Source: Crop distribution by provinces database (1998). Consejería de Agricultura y Pesca, Junta de Andalucía.

(2) Regional database (1997). Consejería de Agricultura y Pesca, Junta de Andalucía.

than 5 hectares. Finally, there are only 7 per cent of farmers with more than 25 hectares and they represent 45 per cent of the total hectareage. Cotton production is relatively much more important to small farmers: the smaller the farm, the higher the percentage with cotton. Thus, in Seville, farms with less than 10 hectares of arable crops, between 10 and 20 hectares, and more than 20 hectares have, respectively, 62.2, 54.4 and 47.4 per cent of total arable land sown with cotton (3).

CROP PROFITABILITY

The results related to variable costs have been obtained from 36 deep interviews with farmers of Valle del Guadalquivir. These costs do not take into account either amortisation costs or financial costs or rent of the land. Official prices supplied by Consejería de Agricultura y Pesca have been used to calculate the gross margin. An average of three years was derived, since this is usually the period considered by farmers in deciding the crop distribution. Likewise, yield data were provided by Consejería de Agricultura y Pesca. The average yield is calculated from a time series of seven years (1990/91-1996/97) (4). Cotton

costs are split up in figure 1 to show differences with other crops considered as alternatives. As we can see, cotton costs are higher in most cases. Only sugar beet has a labour cost similar to the cotton crop (the other "social" crop). In figure 2 the cotton profitability is compared against other crops. Cotton is among the highest gross margins (5), with the highest total variable costs. This high income is due mainly to production related subsidies (see figure 3). Without these subsidies, cotton production would be not possible in Andalusia. Considering the different cotton costs in more detail (see figure 4), we can see how labour and pesticides are the most important.

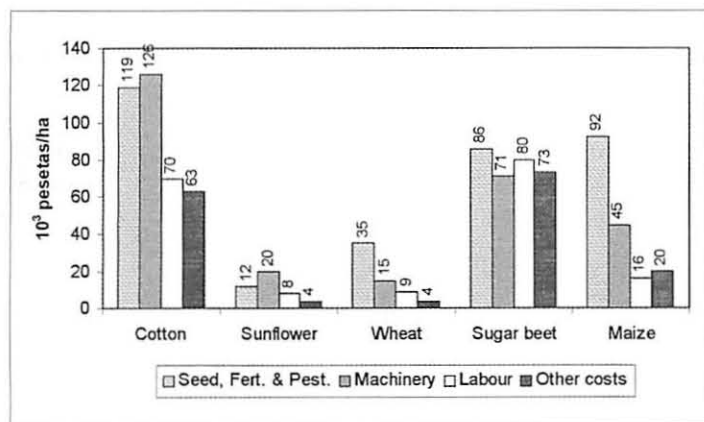


Figure 1 - Cost structure for cotton and alternative irrigated crops in Andalusia in 1996-97. Source: Survey on variable costs of irrigated arable crops in Valley of Guadalquivir (1998) (6).

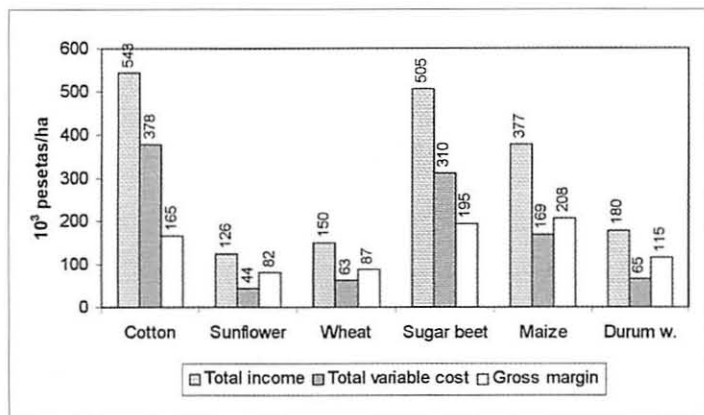


Figure 2 - Total income, total variable costs and gross margin of irrigated crops in Andalusia in 1996-97. Source: Survey (1998). Prices and yields from Consejería de Agricultura y Pesca, Junta de Andalucía.

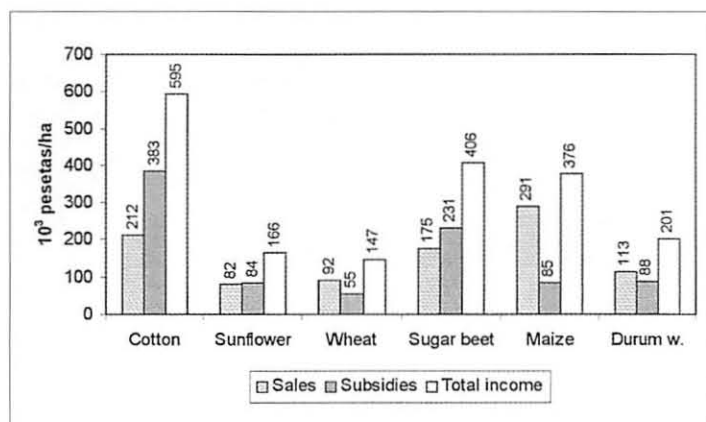


Figure 3 - Average sales, subsidies and total income in Andalusia (1994/95-1996/97). Source: Consejería de Agricultura y Pesca, Junta de Andalucía.

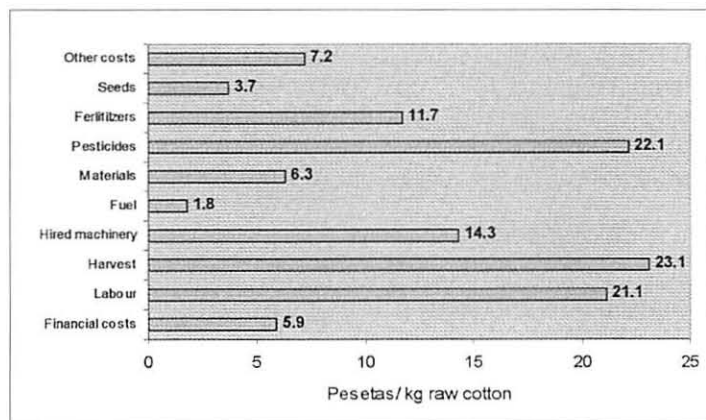


Figure 4 - Specific costs for cotton in 1996-97. Source: Survey on farmers (1998). Average yield in Andalusia: 3,179 kg/ha.

(3) Manuel Arriaza (1998). Data from a survey on 205 farmers in Seville.
 (4) It could be argued that the periods, considered in calculating average price and yield, should be the same, but according to our experience, farmers consider an historic yield and keep in mind the last two or three years. Besides, Andalusia suffers drought periods regularly and it seems safer to cover a longer period to obtain an average yield.
 (5) In 1996/97 due to floods, sunflower could not be sown, thus cotton hectareage increased, reducing the price. In a normal year, cotton has higher gross margin than sugar beet. Maize is another crop with high average gross margin although it is more sensitive to high temperatures.
 (6) Three communities of irrigants in the Valley of Guadalquivir were selected following a random procedure without replacement and probability proportionate to the number of farmers in the community. Farmers were selected in one community using random sampling, and quota sampling in the other two. The total number of interviews was 205.



All the costs sum up 117.2 ptas/kg. They represent around one third of the raw cotton sales. It is interesting to see the relationship between average variable cost and yield. We considered a range of 2,500-5,000 kg/ha. This relationship is shown in **figure 5**. According to this curve, an increase of 500 kg/ha over the present average yield would imply an average variable cost reduction of 14 pesetas/kg. This can be explained by considering the two most important costs: pesticides and labour. Usually, a lower yield implies relatively higher cost on pesticides while the labour cost remains almost constant irrespectively of the production.

CROP RISKINESS

Risk in agriculture comes from two sources: variability of production and prices. To compare crop riskiness we

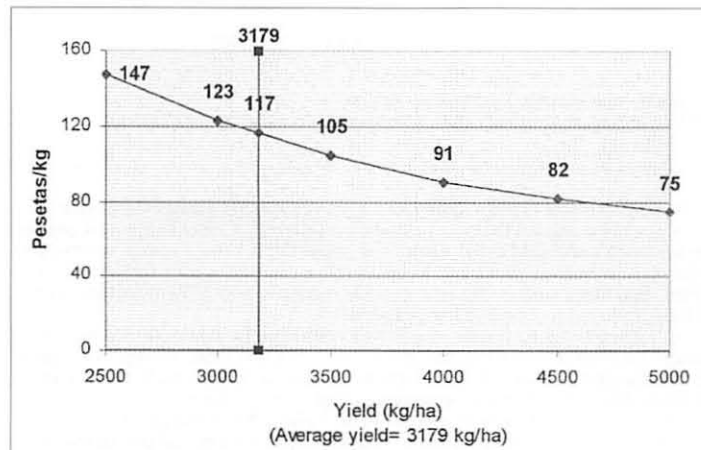


Figure 5 - Average variable cost versus yield (1996-97).
Source: Survey on farmers (1998).

have computed the probability of having a result 20 per cent lower than the average of a time series. **Table 1** shows this measure for yields (agronomic risk), prices (market risk) and gross margin (overall risk). As we can see, cotton and sugar beet have the highest probability of having a low gross margin, due mainly to price changes.

COTTON PRODUCTION COMPETITIVENESS

In this section we compare the competitiveness of Spanish producers and other producers in the world. Only mechanised production is considered. Data refer to 1991/92 and the situation has slightly improved. Comparing with other world producer outside the EU, Spain has the highest variable costs per kilogram of raw cotton, followed by Israel. If we split up these costs (see **figure 6**), we notice that for all variable costs Spain has either the highest or second highest costs. These high costs are the reason for subsidies, without them cotton would not be viable in Spain. The percentage of subsidies upon the price of cotton has decreased in the last years, as we can see in **figure 7**.

WATER EFFICIENCY AND EMPLOYMENT

Table 2 shows some basic figures on cotton and other alternative crops in irrigated lands of Andalusia. This table summarizes the data of previous figures. Since water efficiency and rural employment are key issues in Andalusia, we provide some ratios to compare alternative crops in irrigated lands. **Table 3** shows how the so called "social crops" (cotton and sugar beet) give the highest farm employment rate per unit of subsidy and unit of water.

Also, these crops have the highest gross margin per unit of water.

DIAGNOSIS AND SOME RECOMMENDATIONS

According to the previous analysis, the strengths of the cotton against other alternative crops are:

- Highest income per hectare.
 - High ratio income / water requirement.
 - Most intensive in labour (as sugar beet).
 - Highest variable costs, which represent an important source of income for other agrarian sectors.
 - High ratio labour / water requirement (second, after sugar beet).
- On the other hand, some of the weaknesses of the cotton are:
- High percentage of subsidies, compared to sunflower, durum wheat and maize.
 - High risk of the crop (quota and droughts).
 - Plagues and diseases.
 - Small size of the farms.

Nowadays, cotton is a very important crop from a social and economic point of view in irrigated lands of Andalusia. Being true "Con agua Andalusía anda" (with water Andalusia works) it is also true that "con algodón anda mejor que sin él" (with cotton works better that without it). The continuity of cotton production in Andalusia must be one of the first priorities. This process should be based on:

- Continuity of governmental R&D, improving the access

Table 1 Probabilities of having a result 20 per cent lower than the average.

	Cotton	Wheat	Sunflower	Maize	Sugar beet	Time series
Prices	0.17	0.00	0.17	0.00	0.33	92/93 to 96/97
Yields	0.09	0.27	0.09	0.09	0.09	86/87 to 96/97
Gross margins	0.45	0.18	0.09	0.36	0.55	92/93 to 96/97

Table 2 Comparative data for some irrigated crops in Andalusia (1994/95-1996/97, 10³ pesetas/ha).

	Cotton	Sunflower	Wheat	Sugar beet	Maize
Sales	212	82	92	175	291
Subsidies	383	84	55	231	85
Total income	595	166	147	406	376
Total variable costs	364	42	63	284	173
Gross margins	231	124	84	122	203

Source: Consejería de Agricultura y Pesca, Junta de Andalucía.

Table 3 Comparative ratios of most important irrigated arable crops in Andalusia.

	Cotton	Sunflower	Wheat	Sugar beet	Maize
Water requirements (m ³ /ha)	4800	2900	2100	3900	7500
Labour requirements (10 ³ ptas/ha)	69.0	7.4	7.9	79.6	13.1
R1: Labour/subsidies	0.180	0.088	0.144	0.345	0.154
R2: Labour/water req. (ptas/m ³)	0.014	0.003	0.004	0.020	0.002
R3: Gross margin/water req. (ptas/m ³)	0.048	0.043	0.040	0.031	0.027

Source: Survey on farmers (1998), ratios based on table 2.

to, and speed of dissemination of the information toward the cotton producers.

In this sense, it has a vital role in the "Red andalusí de

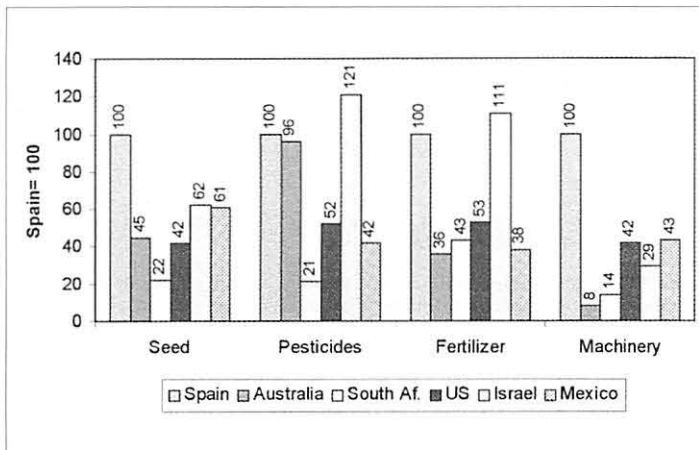


Figure 6 - Comparative costs for some cotton producers in the world. Source: CCLA (1994).

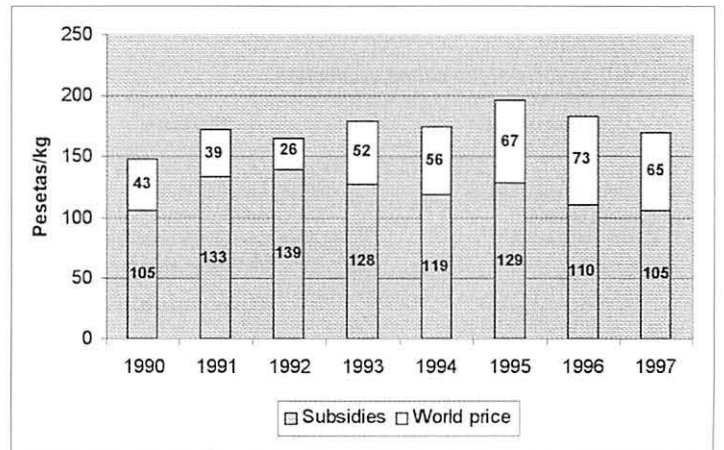


Figure 7 - World price and subsidies (base year 1997). Source: Valderrama (1997).



experimentación agraria” and the ATRIAS of the cotton.

- In case of a reduction of the subsidies, farmers should reduce the variable costs per kg, the only safe way to keep sowing cotton.
- Advisory services from technical staff belonging to either the governmental sector or cotton factories related

to less known aspects such as fertilisation, pest control, plant regulators and irrigation.

- Creation of an integrated association with professionals to monitor the whole process as a system.
- Cotton represents an important source of income in less favoured areas of Spain and Greece. Therefore, subsidies are justified in regions of Southern Europe, like Andalusia.

Finally, **table 4** summarizes strengths, weaknesses, threats and opportunities of the cotton. ●

Table 4 *Diagnosis of the cotton production.*

Weaknesses	Threats
<ul style="list-style-type: none"> • Subsidies much higher than other crops • Risk (future price and yields) • Plagues and diseases • Small size of the farms 	<ul style="list-style-type: none"> • Future reduction of subsidies • World production increase • World Trade Organisation constraints • Liberalisation of the European Union • Textile industry reduction in EU
Strengths	Opportunities
<ul style="list-style-type: none"> • High profitability • Labour demanding crop • New enterprises of services and supplies • High social productivity (man-day/m²) • Good fibre quality • Suitable farmer background 	<ul style="list-style-type: none"> • Support zones objective 1 • Tendencies toward natural fibres • Ecological cotton • Export of high quality fibre • Export of technology

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