THE EFFECTS OF NET RETURNS ON SEED COTTON PLANTED AREA IN ANTALYA

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Abstract

Cotton area in Antalya has exhibited some large fluctuations during the period of 1981-1989. After 1989, cotton area in the region has fallen substantially. The main purpose of this study was to determine the economic reasons for the declining cotton area in the region. The results in this study revealed that the correlation between net returns per hectare and following planted area was positive but statistically non significant for over the study period (1981-1994). However the correlation coefficient (r=0,896) was found significant in the period of after 1989 (1989-1994). In other words cropping decisions are mainly based on net returns of cotton production. The findings of this study imply that farmers in the past were influenced by a wide variety of factors in choosing farm enterprises. However, in recent years because of growing financial pressure's profitability was the leading factor in agricultural decision making.

Introduction

Cotton has been producing in Antalya since 1940s. The rapid raise in input costs particularly spraying has adversely affected cotton's competitive position. Per hectare costs of producing cotton are much greater than those of competing crops in the research area. In recent years the gap between gross income and production costs of row cotton per hectare has occurred very narrow. In fact net returns were below the production costs for some years. In addition, emerging wheat and greenhouse as alternative crops to cotton has led to decrease cotton area in the research area. According to the one research study if profitability of cotton enterprise remains at the current level, farmers will probably give up producing cotton in the research area (Ozkan, 1993).

Another study conducted in Cukurova region showed that there was a strong relationship between previous year's net return per hectare and following year planted area of the cotton (Yurdakul & Oren, 1991). When growers are making their decisions regarding the next year sowing area, they mainly consider previous year's crop prices (Demirci & Ozcelik, 1984). However it should be borne in mind that apart from economic factors, farmers' behaviors and preferences also play important role in terms of determining sowing area (Gasson,1973; Gillmor, 1986; Ozkan, 1993).

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The main objective of this study was to determine the economic reasons for declining cotton area in the Antalya region. For this reason the relationship between the production cots and returns of seed cotton were analysed for the period of 1981-1994.

Material and Method

Antalya, located in the South of Turkey, is one of the main cotton production regions of the Turkey. Aksu Irrigation Project (AIP) was chosen as a representation of Antalya province in the study. There are 35 villages in this irrigation project area and 14500 hectare area is irrigated. Seed cotton production is the main commodity in the AIP area. The material of the study was collected from farm holdings which are operating in the project area. Surveying technique was used to gather relevant data for the study. In addition to original data some secondary data were collected from some institutions including State Irrigate Affairs, Agricultural Province Directorate and Antbirlik.

For investigation term (14 years), yield records were collected from farm holdings in the project area. Crop prices were taken on prices received by farmers. In order to make the research results more useful the value of production costs and net returns were converted to 1994 values. These figures were deflated by a wholesale price index based on 1981 to eliminate inflation effect on prices and the values were expressed in terms of dollar.

Discussion

Seed cotton yield fluctuated among 2860 and 3600 kilograms per hectare in the investigated terms (Table 1). Average seed cotton yield over the past 14 seasons has been 3260 kilograms per hectare. The production costs of seed cotton varied between $ 0.40 and $ 0.63 per kilogram ($1= 35000 Turkish Lira approximately in November 1994). The main factors affecting the production costs of seed cotton were the degree of infestation of disease and insect attack since they affect cotton yield directly. It is therefore spraying takes the biggest proportional share from the production costs of raw cotton. Generally production costs in cotton depend on spraying expenses (Anonymous, 1993, 1994 and 1995). For example, due to the heavy whitefly attack in the 1986 cropping season, the production costs of raw cotton were in the highest for the investigated term.

Crop prices received by farmers are determined by the government and prices changed between $ 0.46 and $ 0.74 per kilogram with respect to 1994 prices. Cotton growers obtained quite high profit in 1983, 1987 and 1994 due mainly to the low cotton production costs. However net returns of seed cotton were very low in 1981, 1982, 1986 and 1990. In 1986, crop prices occurred less than the production costs of the seed cotton and cotton growers earned $ 560 negative net return per hectare. It is therefore, growers did not cover their expenses in that cropping

season. In the investigated term (14 years) net returns always remained lower than 1983 year's net return except 1994 (Figure 1). Due to the large fluctuations between production costs and prices, farmers have not obtained regular income from cotton enterprise. This situation has given rise to a feeling of despair among many cotton growers in the region and they are seriously looking for alternative crops to replace cotton.

The relationship between net return per hectare and production cost was shown in Table 2 and Figure 1. As seen from Figure 1, cotton production areas fluctuate according to mainly previous year's net return of cotton. This is very clear for 1983 production season that was very profitable season for cotton growers. It is therefore that planted area of cotton reached its peak point in 1984 in the whole investigated term. After 1989, there has however been obvious continuation of a downward trend due mainly to low crop prices and low net returns of cotton. As a result, cotton production area fell from 9340 hectares in 1989 to 4082 hectares in 1994. In other words cotton area decreased approximately 56,3 % in this sub term.

The correlation coefficient between net returns and production area was found as r=0,311. This indicates that there is a positive relationship between previous year's net return and planted area but it was not strong. The correlation equation was calculated as Y= 6901+ 1.06X. These results imply that farmers were influenced by a variety of factors. It should thus be pointed out that cotton prices were not a leading motivating factor itself for the whole term.

For the sub-term (after 1989), the relationship between net return and planted area of cotton was found r= 0.896 (p>0,05). This result shows that there is a strong relationship between net return per hectare and planted area of cotton. The correlation equation was found as Y= 2904.04 + 5.96 X . The prices of raw cotton were very low in real terms for the period of 1989-1994 (Table 3). It might be claimed that farmers were mainly influenced crop prices for the sub-term. In other words, due to the financial pressures, crop prices have become to play more important role than that of previous years. Other factors such as announcement wheat prices relatively high by the government and easiness in production of wheat comparing with cotton have also affected in cotton planted area. Wheat production gives more time for the dealing with greenhouses that are the most profitable enterprise in the research area.

A research study conducted in Cukurova region showed that there were big fluctuations planted area and production of cotton in the Cukurova region. According to the results of this study, the fluctuation in planted area of cotton was mainly caused by previous years net return per hectare (Yurdakul & Oren, 1991).

Developments of cotton planted area in Antalya province is very similar to AIP area. Considering Antbirlik records, planted area of cotton reached its peak point in 1984 with 45700 hectares and later, planted area of cotton fluctuated within the years. However, after 1989, this trend has been changed and cotton area has fallen substantially in 1994 and 16000 hectares area planted.

Since crop prices are very important motivating source, alternative crop prices should be also taken into account. During investigated term, planted area of alternative crops did not increase more than cotton but wheat. In 1984 cotton planted area reached its peak point wheat production area was 12434 hectares. Production area of wheat increased to 15183 hectares in 1994 whereas cotton production area fell down to 1600 hectares in the same year.

Generally, cotton/wheat price ratio increased until 1987 and it reached its peak point in 1987. After 1987, cotton/wheat price ratio always were remained below the 1987 level except 1994. This ratio was lowest in 1985 and 1990 years (Table 3). In addition to price ratio, other factors such as low production costs, the ability to double crop and easiness in production of wheat also affected shifting cotton area to wheat production However, for the 1994 production season cotton/wheat price ratio occurred as 7.25 . It will most probably change this trend and production area of cotton is likely to increase in the research area for the coming season.

For the investigated term the developments of cotton prices and costs were examined based on the real terms, as seen from Table 3 an increase of production costs are less than that of crop prices. However, as seen from Table 3 real cotton prices fell down very sharply within the years. For example even if seed cotton prices were determined quite high in 1994, it is still lower than 1987 price level.

In other words, for 1987-1993 term cotton prices always remained below the 1987 prices and it fell the lowest point in 1993 for the last eight years. It is therefore planted area of cotton fell to 16000 hectares. As seen Figure 3 real cotton prices for many years remained less than 1983 and 1994 prices. The changes in the cotton area in other cotton region of Turkey show similar trend with Antalya except Southeastern Anatolia Project (SAP) area. Cotton production in the SAP area was started a few years ago. It is therefore production costs of seed cotton in this project are quite low comparing with Cukurova, Antalya and Aegean region. Particularly spraying costs are very low in the SAP area. It may be pointed out that cotton producers in Antalya will not compete with cotton growers of SAP in the next years. Furthermore, the research studies showed that some other factors including high labor requirement and other difficulties in the cotton production also affected cotton production area (Table 4).

In 1994, not only cotton prices determined very high but also cotton yields were good. It is therefore growers obtained high net return per hectare. For example according to the one research study, *an economic evaluation of field crops in Antalya*, cotton gave the highest net return per hectare for Antalya in 1994 cropping season (Ozkan, 1995). For that reasons cotton production in Antalya area is expected to increase at least by 8-10 thousands hectares for the coming production season.

As a result, apart from the profitability, farmer's goals and preferences also played an important role in farmer decisions in terms of determining sowing area of cotton. However, in recent years this trend has changed and profitability emerged as a main factor in decision-making process due mainly to the economical pressures. It was therefore concluded that production area of cotton in the research area will mainly depend on net returns of cotton for the coming cropping seasons.

Summary

Cotton area in Antalya exhibited large fluctuations in recent years. Correlation coefficient between net return and planted area of cotton for the whole investigated term was found positive direction but non significant. This result imply that apart from economic factors farmers goals and preferences also played an important role in decision-making process of farmers with respect to determining sowing area.

However, after 1989 there has been obvious continuation of a downward trend in terms of planted area of cotton. Correlation coefficient between net return and planted area was found $r = 0.896$ ($P < 0.05$) for this sub-term. It is clear that a significant positive relationship exist between cotton net returns and planted area. Net returns of seed cotton is quite high in the research area in 1994. It means that cotton production area will likely be increase for the coming season. Based on the equation cotton planted area in the AIP can be estimated 7343.6 hectare for 1995 cropping season . This result indicates that profitability has become the main factor in decision-making process of farmers. It was therefore concluded when cotton growers are determining sowing are of cotton, previous year's net return of cotton has mainly been taken into consideration by farmers.

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Table 1. The yields, production costs, crop prices and net returns of cotton in AIP region (by 1994 prices).

	yield (1)	prd. costs (2)		Crop prices (2)		Net returns	
years	kg/ha	$/kg	index	$ /kg	index	$/ha	index
1981	2860	0.45	100	0.49	100	115.79	100
1982	3140	0.43	96	0.47	96	131.61	114
1983	3310	0.41	91	0.62	127	706.83	610
1984	3480	0.43	98	0.60	122	547.06	472
1985	3600	0.44	99	0.52	106	276.89	239
1986	3400	0.63	141	0.46	95	-560.13	-484
1987	2900	0.52	116	0.74	152	645.21	557
1988	2890	0.50	111	0.62	126	346.14	299
1989	3340	0.52	117	0.69	141	557.78	482
1990	3110	0.57	128	0.62	127	155.94	135
1991	3500	0.54	121	0.64	131	345.70	299
1992	3300	0.53	117	0.65	133	405.24	350
1993	3350	0.50	111	0.58	120	287.33	248
1994	3550	0.51	115	0.72	148	745.40	644

Sources : (1) DSI records, (2) Antbirlik records ,
* : $1= 35000 Turkish lira, Ýndex 1981=100

Table 2. The relationship between net returns and planted area of cotton in AIP region.

Years	Net returns (1) $/ha	Planted area (ha)	Planting ratio(2) (%)	Produc-tion (ton)	Yield (kg/ha)
1981	115.79	7052.9	79.0	20171	2860
1982	131.61	8958.2	85.0	28129	3140
1983	706.83	7838.7	75.2	25946	3310
1984	547.06	9579.7	90.1	33337	3480
1985	276.89	8556.9	84.4	32445	3600
1986	-560.13	8504.5	79.0	28195	3400
1987	645.21	7362.9	70.4	21352	2900
1988	346.14	8833.0	79.6	25527	2890
1989	557.78	9339.7	76.1	31195	3340
1990	155.94	6327.1	55.5	19677	3110
1991	345.70	4008.8	36.9	14031	3500
1992	405.24	5541.0	48.5	18285	3300
1993	287.33	4996.0	48.0	16737	3350
1994	745.40	4082.0	47.5	14491	3550

(1) :It was taken from Table 1. (2) : the share of cotton planted area in AIP.
Source: DSI records.

Table 3 . The area, yield, and crop prices on cotton and wheat in Antalya province (1981-1994).

years	Cotton area (ha)	wheat area (ha)	cotton prices $/kg	wheat prices $/kg	cotton/wheat price ratio
1981	35000	125950	0.49	0.12	4.24
1982	37800	110391	0.47	0.12	3.96
1983	36800	126263	0.62	0.11	5.48
1984	45700	124343	0.60	0.13	4.60
1985	42000	127443	0.52	0.15	3.52
1986	41500	127627	0.46	0.12	3.82
1987	36000	142233	0.74	0.11	6.47
1988	38000	142905	0.62	0.11	5.56
1989	41200	137937	0.69	0.12	5.73
1990	30000	138090	0.62	0.17	3.56
1991	20000	153373	0.64	0.13	4.91
1992	23000	140349	0.65	0.11	5.78
1993	20000	144366	0.58	0.11	5.21
1994	16000	151830	0.72	0.10	7.25

Sources: (1) Antbirlik records.
(2) Directorate Agricultural Province records.
* : Prices deflated by a wholesale price index.

Table 4. The important factors affecting the decline cotton area in AIP.

Rank	Factors	Point	Frequency	Percent
1	low profitability	8.53	55	91.7
2	high labor requirement	6.30	54	90.0
3	difficulties in production	5.43	53	88.3
4	poor marketing	3.77	40	66.7
5	late payments of sold crops	2.70	26	43.3
6	unstable crop prices	0.37	5	8.3
7	inadequate land	0.34	2	3.3
8	others (spraying etc.)	0.34	2	3.3

Source: Ozkan, 1993. Economic analysis of the farms and factors affecting cropping pattern in the Aksu Irrigation Project region

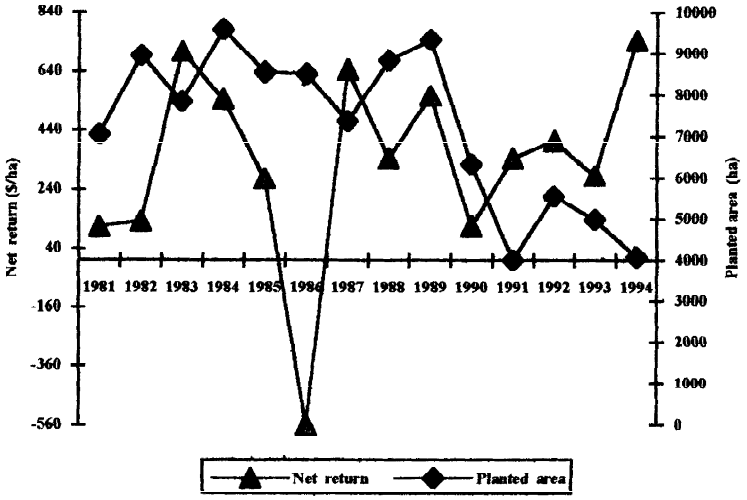

Figure 1. The fluctuations of net returns and planted area on cotton in AIP.