ECONOMIC COSTS AND RETURNS ON SEED COTTON PRODUCTION

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Abstract

The purpose of this study was to determine the production costs and returns of the seed cotton in Antalya province. The study was carried out in the period of 1992-1995. The data of the study were collected from farmers by questionnaire method. The results of the study showed that 820 hours work-force and 32.6 machinery-force are needed to produce seed cotton for per hectare. On a per kilogram basis, the average economic costs of the seed cotton was found $ 0.80. While seed cotton prices received by producers was $ 0.75.

Introduction

Cotton is an important commodity in Antalya. However, the rapid raise in input costs particularly spraying and labour have adversely affected cotton's competitive position. According to the one research study there was a strong relationship between net returns of cotton and planted area of following year (Ozkan, 1996). In recent years, the gap between net returns and production costs per hectare has occurred very narrow. Even tough some years, net return of seed cotton was insufficient to cover the production costs of the seed cotton. As a result cotton planted area in the study region has exhibited some large fluctuations depending on mainly the net returns of seed cotton. The production costs is high in Antalya region due largely to high spraying costs. Spraying expenses is the highest in Cukurova region. It is followed Antalya and Aegean region, and Southeast Anatolia Project (SAP) area. In SAP region cotton relatively new crop comparing with other cotton regions of Turkey. However, regarding the cotton production projections SAP area, in near future, will be the most important region in terms of seed cotton production.

In recent years, due to mainly growing financial pressures farmers are taking into consideration seed cotton production costs more than previous years. On the other hand the dynamic of today's agriculture require continuing adjustments to changing technological and economic conditions. In order to meet that requirement, the determining of the economic costs and returns of seed cotton enterprise is very important. Furthermore cost of production indicators are used for many purposes such as determining relative profitability of various enterprises, discovering current production practices and techniques, and establishing management norms for farms.

Cost of production estimates reflect average production practices, and prices paid and received by farmers. Actually per hectare costs highly variable among farmers due to differences in soil potentials, quantity of inputs used and other factors used in seed cotton production. The production costs of seed cotton ranged from a low of $ 0.61 and high of $ 0.95 per kg. It is therefore results of this study should be assessed to be guidelines.

Material and Methods

This study was carried out in the period of 1992-1995 in Antalya province. The data were collected from farmers by questionnaire method. In the study firstly villages where cotton produced commonly were identified. From these sub-locations 112 farms were selected by means of the simple sampling for the data collection of primary data. Sample farm highly varied depending on the size of investigated farms (small farms less than 4 ha, average farms 4-8 ha and large farms greater than 8 ha).

Costs of seed cotton production were analysed with an enterprise budgeting approach. Other enterprises in the investigated farms were ignored. Majority of producers own tractor and equipment. It is therefore machinery costs were calculated regarding fixed and variable costs of machinery. In the study, annual machinery operating costs and capital replacement costs to cotton enterprise based on estimates of hours that the machine was used on the cotton production. The fixed or ownership costs of machinery include capital recovery (depreciation plus interest rate on the money invested in the machine) housing and insurance. The variable or operating costs of machinery include fuel, lubrication, repairs and maintenance, and labour costs (Boehlje & Eidman, 1984; Castle, et al, 1987; Kepner, et al, 1982).

The production costs of seed cotton were estimated based on the fixed costs and variable costs of seed cotton. The fixed costs include land rent, family labour, permanent labour, the ownership costs of the machinery and general overhead costs. General overhead costs was accepted 3 percent of the total production costs. The variable costs include seed, fertiliser, seed fumigation, chemicals, hired labour, the operating costs of the achinery, transportation and interest rate of the operating capital. The interest rate of operating capital or opportunity costs, the agricultural credit interest rate (25 %) as applied the Agricultural Bank of Turkey was used (Ozkan & Kuzgun 1996).

The sum of the variable and fixed costs is the total production costs of seed cotton per hectare. In order to find per kilogram seed cotton cost, the total production costs of the seed cotton were divided by per hectare seed cotton yield. Gross income was found multiplying seed cotton

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price by seed cotton yield. Gross income was calculated by subtracting the total variable costs from the gross cotton income. The difference between total gross income and total production costs is the total net returns.

Physical values of seed cotton production are the average values in the period of 1992-1995. While calculations of seed cotton costs and returns are based on 1995 prices ($1=50000 Turkish Lira approximately in October 1995). Costs and returns were expressed in terms of dollar overcome the problem of the high inflation rate locally assuming that exchange rates and inflation rates are closely related. The data collected farmers were grouped in different characteristics and analysed into percentage, mean and index.

Results and Discussion

Seed cotton is harvested by hand picking in Turkey. It is therefore per hectare work-force and machinery-force requirements of the seed cotton production were calculated and given in Table 1. In addition to the work and machinery force requirements operation time and operation number of the main cost items for the seed cotton production were also given in the same table. As can be seen from the table per hectare seed cotton production was needed 820 hours work-force and 32.6 hours machine-force.

It should be pointed out that seed cotton production in Turkey is based on largely work-force due mainly to harvesting costs since seed cotton is harvested by hand picking. It is therefore half of requested work force in the seed cotton production was used only in harvest (Table 2). It can be seen from the table, regarding the requested work-force harvesting is followed by hand hoeing and irrigation. It is very clear that harvesting and hoeing take the biggest proportional share from the total work force in the raw cotton production.The work-force has become very expensive particularly in recent years. Together with spraying costs, work-force costs have affected adversely cotton's competitive position in the study area (Anonymous, 1996). If the profitability of cotton enterprise remains at the present level, cotton producers will probably give up producing cotton.

In the investigated farms, per hectare material usage and its costs are given in Table 3. As seen from the table spraying costs take about 47.99 % of the total material costs. The spraying costs are followed by fertiliser costs (34.93 %). Per-hectare and per-kilogram basis, the total production costs of seed cotton were given in Table 4. As seen from the table, on a per kilogram basis, the costs of seed cotton was $ 0.80. As explained in the material and method section, this figure was found in dividing of the total economic costs by the yield of seed cotton.

The proportional share of the main input used in the seed cotton production costs were summarised in Table 5. It can be seen from table the biggest proportional share taken from the total production costs is the work force (37.75 %). Work-force costs are followed by material expenses (29.02 %). For the comparison purposes data are also provided for wheat enterprises and given in Table 5.

Requested work-force is highly variable among the cotton regions of Turkey. The reason is for this mainly come from yield differences. As mentioned earlier, seed cotton is harvested by hand picking and workers are paid based on the quantity of seed cotton picked in per day. The wage rate used in this study $ 0.15 for per kilogram of picked seed cotton. Workers generally can pick up to 100 kilogram seed cotton per day. It is very clear that work force requirements of the seed cotton vary depending in the yield level. Survey results showed that per kilogram seed cotton prices received by producers was $ 0.75. Based on this price, per hectare basis cotton production, gross margin, net return and break-even prices are given in Table 6.

According to the calculations the production costs of seed cotton per kilogram was $ 0.80. While seed cotton prices received by producers was $ 0.75. It indicates that production costs of seed cotton was higher than the price of seed cotton. In other words net returns of seed cotton was insufficient to cover the total costs of seed cotton production. It should be however kept in mind that the total costs include imputed values for land rent and family labour. If we consider only variable costs, seed cotton prices received by farmers were higher than its variable costs. It is the reason why cotton farmers are still to continue producing cotton even though they obtain negative net return.

Another point should be stressed here that generally the fixed costs were ignored by producers regarding in decision-making process. It was observed that cotton producers consider the only variable costs in deciding what to produce, how to produce and how much to produce. In this case positive gross margin plays an important role in decision-making process. In this study farmers obtained $ 375.48 gross margins per hectare. It means that cotton producers can meet their cash expenses in the seed cotton production. Break-even prices of seed cotton above total variable costs is $ 0.63 which is lower than seed cotton price ($ 0.75) received by producers.

Conclusion

This study represents province level of seed cotton production costs and returns in the period of 1992-1995. The data collected from farmers in the villages of Antalya province. The research findings showed that the requested work force per hectare and machine force were 820 hours and 32.6 hours respectively. On a per kilogram basis, the economic costs of seed cotton was $ 0.80. While cotton price received by cotton producers was $ 0.75. It is concluded that net return of per kilogram of seed cotton was

insufficient to cover economic costs of seed cotton production in the research area. In other words cotton producers had negative net income. However gross margin was sufficient to cover total variable costs of seed cotton production.

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Table 1. Requested work-force for seed cotton production per hectare.

	Requested work-force and machine- force (hours/ha)					
Operations	work -force			machine- force		
	hours (h)	cost/ hour	total ($)	No of oper.	hours (h)	total ($)
1.**Land prep. and planting**	**5.2**				**17.0**	**145.20**
				0.5	2.4	14.87
- first tillage)				1.1	3.4	27.39
- second tillag						
- other tillages				1.3	1.6	19.13
- discing				4.2	4.7	38.55
- harrow				3.3	3.2	25.68
- land plane	5.2	0.46	2.39	1.0	2.7	19.58
-planting(drills)						
2. Cultural	**407.3**				**15.6**	**107.45**
Practices						
-fertilizer	-	-	-	1.0	0.4	3.73
-basal dressing	4.0	0.60	2.40	2.2	-	
-top dressing						
-spraying	0.8	1.2	0.96	0.9	0.5	2.92
-herbicide	-	-	-	1.0	-	
-fungicide	12.4	1.2	14.88	2.9	2.8	8 .47
-insecticide				0.7	-	7.00
-insecticide*						
-irrigation				1.0	1.7	12.37
-furrow cult	109.6	0.80	87.68	5.2		
- irrigation						
- Hoeing				4.0	10.2	72.96
- by cultivator	280.4	0.46	128.98	2.8		
- by hand						
3. Harvesting	**407.5**					**9.22**
-harvesting	407.5	3120	468.0	3.0		-
-trans.to farm		*0.15		1.0		9.22
4. Marketing						**35.00**
-prep.for market			18.0			-
-trans to market						35.00
5. Total	**820.0**		723.19		**32.6**	**296.87**

*: applied by aeroplane

Table 2. The proportional share of the main production operations in the total requested work force.

Operations	The proportional shares from the work-force (%)
1. Planting	2.62
2. Cultural practices	
fertilizing	0.54
spraying	1.86
irrigation	13.14
hoeing	34.42
- by hand	33.42
- by cultivator	1.00
3. Harvesting	47.42
Total	100.00

Table 3. The amount of material used in seed cotton production (per hectare).

Material	Number of operation	Quantity (kg)	Total expenses ($)	%
Seed	1.00	58	29.81	5.28
Fertiliser		(pureNPK)		34.93
-basal dress	1.00		90.94	
-top dress	2.30	59-74-22	106.37	
		145-11-04		
Chemicals				47.99
-herbicide	0.93		12.83	
-fungicide	1.00	-	12.18	
-insecticide	3.54	-	246.03	
		-		
Irrigation	5.00		45.00	7.97
Harvesting	3.00			1.42
-bags (numb)		1	8.00	
Marketing				2.41
-robe	-	1.14	2.87	
-bags (numb)	-	36	10.75	
Total			564.78	100.0

Table 4. The production costs of seed cotton (per hectare).

Cost items	Per hectare costs ($)	%
1. Land preparation and planting		**7.0**
1. first tillage (fall)	14.87	
2. second tillage (spring)	27.39	
3. discing	19.14	
4 harrow	38.55	
5. land plane	25.68	
6. Planting	51.78	
2. Cultural Practices		**33.7**
1. Fertilizing		8.0
-basal dressing	94.67	
- top dressing	108.70	
2. Spraying		12.0
-herbicide	16.70	
-fungicide	12.18	
-insecticide	276.39	
3. Irrigation		5.7
-furrow cultivator	12.37	
-irrigation	132.68	
4. Hoeing		8.0
-by cultivator	72.96	
-by hand	128.98	
3. Harvesting		**19.6**
1. harvesting (by hand)	487.42	
2. transport to farm	9.22	
4. Marketing		**2.6**
1. prep.for market	2.87	
2. transport to market	63.75	
5. Land rent	350.00	**13.8**
6. Production costs	1946.37	**76.7**
7. General overhead costs (3 % @ 6)	58.39	**2.3**
8. Operating interest (25 % @ 6)	486.59	**19.2**
9. Total Production Costs	2491.36	**100.0**
1**0. Seed cotton costs per kilogram** average yield = 3120 kg/ha)	0.80	

Table 5. The proportional distribution of the main cost items in the seed cotton and wheat production costs (%).

Cost items	Seed cotton	Wheat
Land rent	17.98	43.56
Machine- force	15.25	20.21
Work-force	37.75	1.86
Material costs	29.02	34.37
Total	100.0	100.0

Table 6. Net returns of seed cotton and wheat production per hectare.

Items	Seed cotton	Wheat
1. Total production costs ($/ha)	2491.36	76.39
2. Gross income ($/ha)	2352.73	79.68
3. Total variable costs ($/ha)	1977.25	45.93
4. Gross margins ($/ha)	375.48	33.75
5. Total fixed costs ($ha)	514.11	30.46
6. Net returns ($/ha)	-138.63	3.29
7. Gross income /total production costs (%)	94	104
8. Break-even prices ($/kg)		
Above total variable costs	0.63	0.11
Above total costs	0.80	0.18*

seed cotton 3120 kg @ $ 0.75
wheat 4320 @ 0.16and plus net return of straw
*: net return of straw is not included