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# A research on calculation of cost of pistachio production in \_anliurfa province

S. Paksoy

Faculty of Economics and Administrative Sciences, Harran University, 63300 \_anliurfa, Turkey

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**SUMMARY** – In this research, the cost of pistachio production was calculated in farms in Center town, Bozova and Birecik town of \_anliurfa province. The research included 1996-1997 production period. In 15 villages, representing research area with respect to natural factors and agricultural techniques, 52 farms were classified into three groups as 1-25 decare (first group), 26-50 decare (second group) and more than 50 decare (51+, third group) decare by using the method of stratified random sampling. In the research, acceptable mistake portion is 10% and it has been studied in 90% confidence level. According to results of the research, on the farms studied, 100% of farms was owned land. There was no sharecropping and no rented land. The average operated land was 31.9 decare for a farm. Value of pistachio farm was found 10,060,897,000 Turkish Liras (TL), value of land without pistachio was found 3,287,077,000 TL and portion of amortization was found 96,769,000 TL for each farm. 48.1% of farms have sold their product to cooperatives, others (51.9%) have sold to merchants. Output was estimated at 64.7 kg for each decare. Net profit was estimated at 215,994 TL for each farm. Total general cost of pistachio production was calculated for each farm as 235,141,000 TL in the first group, 502,356,000 TL in the second group, 898,773,000 TL in the third group and 429,533,000 TL in the average cost. As a result, studied farms seem to have some problems. One of them is selling. They have also the problem to find workmen. They need cheaper credits and cheaper inputs. These questions of the farms must be solved immediately by the government and other related foundations.

**Key words:** Land of farm, net profit, cost of pistachio production, value of pistachio farm.

**RESUME** – "Recherches sur le calcul des coûts de production de pistaches dans la province de Sanliurfa". Dans cette étude, le coût de production de pistaches a été calculé dans des fermes qui se trouvent près de villes du centre, à Bozova et Birecik dans la province de Sanliurfa. La recherche a incorporé la période de production 1996-1997. Dans 15 villages, représentant la zone d'étude en ce qui concerne les facteurs naturels et les techniques agricoles, 52 fermes ont été classées en trois groupes qui sont 1-25 decare (premier groupe), 26-50 decare (deuxième groupe) et plus de 50 decare (51+, troisième groupe), en utilisant la méthode d'échantillonnage aléatoire stratifié. Dans cette étude, la part d'erreur acceptable est de 10% et l'étude est faite selon un niveau de confiance de 90%. D'après les résultats de l'étude, sur les fermes étudiées, 100% des fermes étaient des terres en propriété. Il n'y avait ni métayage ni fermage. La moyenne des terres opérationnelles était de 31,9 decare par ferme. La valeur d'une ferme de pistachiers était de 10 060 897 000 liras turques (TL), la valeur de la terre sans pistachiers était de 3 287 077 000 TL, et la part de l'amortissement était de 96 769 000 TL pour chaque ferme. 48,1% des fermes vendaient leur produit aux coopératives, d'autres (51,9%) vendaient aux négociants. La production a été estimée à 64,7 kg par decare. Le bénéfice net a été estimé à 215 994 TL pour chaque ferme. Le coût total général de la production de pistaches a été calculé pour chaque ferme à 235 141 000 TL pour le premier groupe, 502 356 000 TL pour le deuxième groupe, 898 773 000 TL pour le troisième groupe, et 429 533 000 TL pour le coût moyen. Comme résultat, les fermes étudiées présentaient quelques problèmes. L'une d'elles est en vente. Il est également difficile de trouver de la main-d'oeuvre. Ils ont besoin de crédits à moindre taux et d'intrants moins onéreux. Ces problèmes des fermes doivent être résolus immédiatement par le gouvernement et autres entités connexes.

**Mots-clés :** Terres des exploitations, bénéfice net, coût de la production de pistaches, valeur de la ferme de pistachiers.

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## Introduction

Pistachio is brought up in special climate condition so its area of bringing up is limited in the world. It has got an important dry fruits and is brought up in the region of southeastern Anatolia in Turkey. This fruit is brought up both dry and watery condition and it is produced mostly in Iran, USA and Turkey in the world (FAO, 1989).

In the research area, pistachio is 97.9% of fruit trees in \_anliurfa province (Yıldız, 1998) and it was brought up mostly Center, Bozova, Birecik and Halfeti towns by farmers as a source of livelihood.

Pistachio gives product in dry condition in 13-14 years, in watery condition in 8-9 years and in one of two years. This position effects mostly cost of pistachio production.

In this study, it was investigated cost of pistachio production where is brought up Center, Bozova and Birecik towns of \_anliurfa province. In addition, it was studied to determine farm of own land, yield of product, marketing position and having net profit.

## Material and method

### Material

The main material of this research creates data which having from farmers (pistachio) where are in Center, Bozova and Birecik towns of \_anliurfa province by survey methods. The second material is other researches and studies related to this subject.

### Method

The first stage of the research to choose farms for applying survey, farms has been determined considering large of farm land in area of research in 1996-1997 production period. 385 farms have been determined in selected 15 villages.

385 farms have been formed from population and 52 pattern farms from this population have been determined to apply questionnaire representing research area with the respect of natural factors and agricultural techniques by using the method of stratified random sampling.

52 pattern farms were classified into three groups as 1-25 decare (first group), 26-50 decare (second group) and more than 50 decare (50-+ group, third group) (Table 1). When the pattern farms have not been found, questionnaire has been applied to reserve farms which are in the same region.

Table 1. Number and ratio of the pattern farms

Groups of farms large	Pattern farms	
	Number	Percent (%)
1-25 (I Group)	28	53.8
26-50 (II Group)	15	28.8
51-+ (III Group)	9	17.4
Total	52	100.0

To determine pattern farms the formula has been used by given (Yamane, 1967):

$$n = \frac{N \times NhSh^2}{(N^2 \times D^2) + NhSh^2}$$

where: n = number of pattern farms; N = number of farm population; Nh = number of farms in class of h; Sh = standard deviation; D is d/z; d = mistake amount to let from average of aggregate; z = degree of z table (normal distribution).

In the research, acceptable mistake portion is 10% and it has been studied in 90% confidence level. To distribute the determined farms to groups (Nh/N) x n formula has been used (Yamane, 1967). According to this, total 52 farms have been determined and there have been 28 (53.8%) farms

in the first group, 15 (28.8%) farms in the second group, 9 (17.4%) farms in the third group. In addition, reserve farms have been determined as 25% of each group. 1 decare (da) = 1000 m<sup>2</sup>.

## Collecting data

After determining pattern farms, questionnaire has been prepared for collecting data related to accounting cost of pistachio production.

The questionnaires have been filled in December 1997 and they have included 1996-1997 production period. The questionnaires have been filled by using face to face method.

## Estimating the data

All calculations and results with having invention from the research have been done according to three farm groups and average of farms. Economic life of pistachio tree has been accepted as 100 years (Anonymous, 1997a).

Amortization portion of foundation has been calculated as following formula:

$$\text{Amortization portion of foundation} = \frac{(\text{garden value in filling survey}) - (\text{land value without pistachio})}{\text{economically leap year}}$$

Some calculations have been done as following formulas: general total cost divide average yield = cost of 1 kg pistachio; average yield divide large of plot of land = yield for 1 decare; selling price minus cost of pistachio = net profit.

## Results of the research and discussion

### Width of land in research farms

Width of land in research farms has been found 14.6 da in the first group, 38.2 da in the second group, 75.1 da in the third group and 31.9 da in the average of farms. Once more, plot of land has been found 1 for first and second group, 1.20 for third group, 1.03 for average of farms. Width of plot of land has been found 14.6 da for the first group, 38.2 da for the second group, 62.6 da for the third group and 30.8 da for the average of farms (Table 2).

Table 2. Width of land in the research farms

Groups of farms large	Width of land (da)	Plot of land	Width of plot (da)
1-25	14.6	1.00	14.6
26-50	38.2	1.00	38.2
51-+	75.1	1.20	62.6
Average of farms	31.9	1.03	30.8

### Situation of owning land

All land are owning land, there is no rent land and partnership in the research farms.

### Value of pistachio garden, value of land without pistachio tree and amortization portion

In the research farms, value of garden has been found 10,060,897,000 Turkish Liras (TL), value of land without pistachio tree has been found 3,287,077,000 TL, amortization portion has been found 96,769,000 as average of farms TL. Year of average founding of pistachio garden has been 1970 (Table 3).

Table 3. Value of pistachio garden, value of land without pistachio tree and amortization portion in the research farms

Groups of farms large	Value of garden (TL)	Value of land without pistachio tree (TL)	Year of average founding	Amortization portion (TL)
1-25	5,345,238,000	1,326,000,000	1969	58,249,000
26-50	13,800,000,000	3,220,000,000	1971	149,014,000
51-+	18,500,000,000	9,500,000,000	1978	115,385,000
Average of farms	10,060,897,000	3,287,077,000	1970	96,769,000

### Average yield and yield for a decare

Average yield has been found 1102 kg for first and 2400 kg for second group, 4500 kg for third group, 2065 kg for average of farms. Once more, yield for a decare has been found 75.5 kg for first and 62.8 kg second group, 59.4 kg for third group, 64.7 kg for average of farms (Table 4).

Table 4. Average yield and yield for decare in the research farms

Groups of farms large	Average yield (kg)	Yield for decare (kg)
1-25	1102	75.5
26-50	2400	62.8
51-+	4500	59.4
Average of farms	2065	64.7

### Production (pistachio) cost

In Tables 5-8 production (pistachio) cost in the research farms has been calculated as groups and average of farms. Cost of input, cost of labour, cost of transport and other costs have been clearly examined under functioning.

In this research normal interest ratio of cost made is 21%, ratio of general management cost is 3% of total (A) (see Tables 5-8). Interest ratio of land without tree has been accepted 5%. Amortization portion of foundation, interest of costs made, cost of general management and interest of land without tree have been added and total general cost has been found.

#### *First group (1-25 da)*

In the first group 3.41% of total general cost is cost of input, 24.33% is cost of labour, 1.06% is cost of transport, 9.13% is other cost (watchman), 7.96% is normal interest of cost made, 1.14% is cost of general management, 28.20% is normal interest of land without tree and 24.77% is amortization portion of foundation cost. Cost of pistachio has been found 213,377 TL for 1 kg (Table 5).

#### *Second group (26-50 da)*

In the second group 6.25% of total general cost is cost of input, 20.22% is cost of labour, 0.71% is cost of transport, 3.70% is other cost (watchman), 6.48% is normal interest of cost made, 0.93% is cost of general management, 32.05% is normal interest of land without tree and 29.66% is amortization portion of foundation cost. Cost of pistachio has been found 209,315 TL for 1 kg (Table 6).

### *Third group (50-+ da)*

In the third group 2.78% of total general cost is cost of input, 18.19% is cost of labour, 0.78% is cost of transport, 5.92% is other cost (watchman), 5.81% is normal interest of cost made, 0.83% is cost of general management, 52.85% is normal interest of land without tree and 12.84% is amortization portion of foundation cost. Cost of pistachio has been found 199,727 TL for 1 kg (Table 7).

Table 5. Production (pistachio) cost in the first (1-25 da) group in the research farms

Functioning	TL	Percent (%)
Cost of input	8,028,000	3.41
Cost of dung	2,681,000	
Cost of remedy	5,347,000	
Cost of labour	57,189,000	24.33
Fence repair	—	
First soil tillage	2,079,000	
Second soil tillage	2,079,000	
Labour of dung	710,000	
Lop labour	4,452,000	
Third soil tillage	2,490,000	
Forth soil tillage	2,680,000	
Remedy labour	5,952,000	
Gross labour	4,790,000	
Reaping labour	15,571,000	
Carry labour	1,610,000	
Other labours	12,619,000	
Dry labour	2,157,000	
Cost of transport	2,496,000	1.06
Carrying to storehouse	379,000	
Marketing	2,117,000	
Other costs	21,474,000	9.13
Watchman	20,426,000	
Tax of land	—	
Insurance	—	
Packing	1,048,000	
<i>Total (A)</i>	<i>89,187,000</i>	<i>37.93</i>
Normal interest of costs made (21%)	18,729,000	7.96
Cost of general management (3%)	2,676,000	1.14
Normal interest of land without tree (5%)	66,300,000	28.20
Amortization portion of foundation cost	58,249,000	24.77
<i>Total of general cost</i>	<i>235,141,000</i>	<i>100.00</i>
Cost of pistachio for 1 kg	213,377	—

### *Average of farms*

Total cost of these inputs (A) has been 89,187,000 TL in the first group, 155,115,000 TL in the second group, 248,700,000 TL in the third group and 135,815,000 TL in the average of farms. In the average of farms, ratio of these costs is 31.62% in the total general cost. Cost of labour is 20.58%, cost of input is 4.12%, cost of transport is 0.84% and other costs (watchman) is 6.08% of this ratio (31.62%).

Total general cost has been calculated 235,141,000 TL in the first group, 502,356,000 TL in the second group, 898,773,000 TL in the third group and 429,533,000 in the average of farms.

The biggest portion is normal interest of land without tree (38.26%) in the total of general costs. Ratio of amortization portion of foundation cost is 22.53% as second and ratio of labour cost is 20.58% as third (Table 8).

Table 6. Production (pistachio) cost in the second (26-50 da) group in the research farms

Functioning	TL	Percent (%)
Cost of input	31,400,000	6.25
Cost of dung	15,800,000	
Cost of remedy	15,600,000	
Cost of labour	101,540,000	20.22
Fence repair	—	
First soil tillage	4,230,000	
Second soil tillage	4,230,000	
Labour of dung	800,000	
Lop labour	8,100,000	
Third soil tillage	5,260,000	
Forth soil tillage	5,260,000	
Remedy labour	17,400,000	
Gross labour	12,000,000	
Reaping labour	20,200,000	
Carry labour	3,700,000	
Other labours	18,400,000	
Dry labour	1,960,000	
Cost of transport	3,575,000	0.71
Carrying to storehouse	565,000	
Marketing	3,010,000	
Other costs	18,600,000	3.70
Watchman	15,000,000	
Tax of land	—	
Insurance	—	
Packing	3,600,000	
<i>Total (A)</i>	<i>155,115,000</i>	<i>30.88</i>
Normal interest of costs made (21%)	32,574,000	6.48
Cost of general management (3%)	4,653,000	0.93
Normal interest of land without tree (5%)	161,000,000	32.05
Amortization portion of foundation cost	149,014,000	29.66
<i>Total of general cost</i>	<i>502,356,000</i>	<i>100.00</i>
Cost of pistachio for 1 kg	209,315	—

On the other hand, cost of pistachio for 1 kg has been found 208,006 TL in the average of farms (Table 8). In an other research cost of pistachio for 1 kg has been found 211,005 TL in the average of farms in the same production period (Anonymous, 1997b).

## Net profit

Net profit has been found 216,623 TL for first group, 210,000 TL for second group, 230,270 TL for third group and 215,994 TL for average of farms. Selling price is 425,000 TL for first group, 420,000 TL for second group, 430,000 TL for third group. In the average of farms, selling price of pistachio is 424,000 TL. Cost of production is 213,377 TL for first group, 209,315 TL for second group, 199,727 TL for third group and 208,006 TL for average of farms (Table 9).

## Marketing

In the research farms, in the first group 35.7% of total production (pistachio) has been sold to

cooperatives, 64.3% has been sold to merchants. In the second group 60.0% of total production (pistachio) has been sold to cooperatives, 40.0% has been sold to merchants. In the third group 66.6% of total production (pistachio) has been sold to cooperatives, 33.4% has been sold to merchants. In the average of farms 41.1% of total production (pistachio) has been sold to cooperatives, 51.9% has been sold to merchants (Table 10).

Table 7. Production (pistachio) cost in the third (51-+ da) group in the research farms

Functioning	TL	Percent (%)
Cost of input	25,000,000	2.78
Cost of dung	5,000,000	
Cost of remedy	20,000,000	
Cost of labour	163,500,000	18.19
Fence repair	—	
First soil tillage	7,500,000	
Second soil tillage	7,500,000	
Labour of dung	3,000,000	
Lop labour	21,000,000	
Third soil tillage	9,750,000	
Forth soil tillage	9,750,000	
Remedy labour	5,000,000	
Gross labour	15,000,000	
Reaping labour	40,000,000	
Carry labour	5,000,000	
Other labours	30,000,000	
Dry labour	10,000,000	
Cost of transport	7,000,000	0.78
Carrying to storehouse	2,000,000	
Marketing	5,000,000	
Other costs	53,200,000	5.92
Watchman	50,000,000	
Tax of land	—	
Insurance	—	
Packing	3,200,000	
<i>Total (A)</i>	<i>248,700,000</i>	<i>27.67</i>
Interest of costs made (21%)	52,227,000	5.81
Cost of general management (3%)	7,461,000	0.83
Normal interest of land without tree (5%)	475,000,000	52.85
Amortization portion of foundation cost	115,385,000	12.84
<i>Total of general cost</i>	<i>898,773,000</i>	<i>100.00</i>
Cost of pistachio for 1 kg	199,727	—

## Conclusion and suggestion

In the provinces of GAP region have 35,769,219 pistachio trees by 1994 data. 39.5% (14,119,764) of this are in \_anliurfa province (D\_E, 1996). Pistachio is very important source of income in \_anliurfa and province of GAP region.

In this research cost of pistachio for 1 kg has been found 208,006 TL in the average of farms. In the other hand, average yield is 2065 kg, yield for a decare is 64.7 kg, net profit is 215,994 TL/kg in the average of farms. In the research farms, 41.1% of total production (pistachio) has been sold to cooperatives, 51.9% has been sold to merchants in the average of farms.

The farmers of pistachio have problems about cost of labour and marketing. According to them, cost of labour is very high and marketing is very difficult. Cooperatives buy their products just in time but they do not pay to them just in time. In the other hand, pistachio gives product in one of two years



as its peculiarity. This position effects as negative to cost of production and net profit. In another form, cost of pistachio must calculate in the long term (10-15 years).

On the other hand, farmers must make their works as mechanical to reduce cost of labour. Some precautions are been taken to estimate farmers' productions. Merchants must act equity to farmers when they buy their products and farmers must not sacrifice to despotism of cooperative managers.

Table 8. Production (pistachio) cost in the average of farms in the research farms

Functioning	TL	Percent (%)
Cost of input	17,708,000	4.12
Cost of dung	6,867,000	
Cost of remedy	10,841,000	
Cost of labour	88,384,000	20.58
Fence repair	—	
First soil tillage	3,638,000	
Second soil tillage	3,638,000	
Labour of dung	1,132,000	
Lop labour	8,368,000	
Third soil tillage	4,546,000	
Forth soil tillage	4,648,000	
Remedy labour	9,090,000	
Gross labour	8,637,000	
Reaping labour	21,134,000	
Carry labour	2,800,000	
Other labours	17,295,000	
Dry labour	3,458,000	
Cost of transport	3,587,000	0.84
Carrying to storehouse	713,000	
Marketing	2,874,000	
Other costs	26,135,000	6.08
Watchman	23,979,000	
Tax of land	—	—
Insurance	—	—
Packing	2,157,000	
<i>Total (A)</i>	<i>135,815,000</i>	<i>31.62</i>
Normal interest of costs made (21%)	28,521,000	6.64
Cost of general management (3%)	4,074,000	0.95
Normal interest of land without tree (5%)	164,354,000	38.26
Amortization portion of foundation cost	96,769,000	22.53
<i>Total of general cost</i>	<i>429,533,000</i>	<i>100.00</i>
Cost of pistachio for 1 kg	208,006	—

Table 9. Net profit in the research farms<sup>†</sup>

Groups of farms large	Selling price (TL) (A)	Cost of production (TL) (B)	Net profit (TL) (A – B)
1-25	425,000	213,377	216,623
26-50	420,000	209,315	210,000
51-+	430,000	199,727	230,270
Average of farms	424,000	208,006	215,994

<sup>†</sup>Note: 1 US \$ = 204,750 TL buying, 205,740 TL selling; 1 Deutsche Mark = 114,240 TL buying, 114,790 TL selling as average of months in Turkey in 1997 (D\_E, 1999).

Table 10. Marketing in the research farms

Groups of farms large	To cooperative		To merchant		Total	
	Number	Percent (%)	Number	Percent (%)	Number	Percent (%)
1-25	10	35.7	18	64.3	28	100.0
26-50	9	60.0	6	40.0	15	100.0
51-+	6	66.6	3	33.4	9	100.0
Total	25	48.1	27	51.9	52	100.0

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