

## **Economic analysis of certified nursery producing enterprises in temperate climate fruits: a case of Isparta Province**

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### **Abstract**

In this study, the fruit production in Turkey which is of immense importance to examine the economic point of view of the temperate climate fruit species nursery. With these objectives carried out in the province of Isparta, the cost and profit of the producing nursery, the problems with their respective solutions were identified in the enterprises. In addition, the impact of the policies on the manufacturer in the region was determined. The data used in the research for the production period between 2011 and 2012 for 50 provinces of Isparta's certified enterprises producing nursery. The temperate climate fruit species were obtained using complete counting. From the 50 nursery enterprises examined according to their legal status structure, 14 percent is stock Corporation, 18 percent sole proprietorship, 4 percent was public enterprise and 64 percent accounted for cooperative partnership. Survey conducted in the nursery enterprises with respect to land used is amounted to 58.94 decare. Averagely, 79,050 seedlings were produced in the enterprises with apple being the highest which accounted for 81.03 percent out of the total production. The gross productions value was TL 359,228.60, TL 173,687.67 was also for production costs and the gross profit accounted as TL 289,465.86 while the absolute profit and relative profit amounted to TL 185,540.93 and 2.07 respectively. Moreover, the cost of production of a sapling is amounted to TL 2.20 per unit and the selling price is TL 4.54 per unit.

**Keywords:** Nursery. temperate climate. Economic analysis.

## 1. Introduction

Fruit production begins with the production of fruit nursery. Nursery production with all related processes and activities are called nursery. In the fruit production for fruit seedlings the right name; profit and economic used were necessary and standards. Activities such as proper pruning, plant protection, irrigation, fertilization and soil conservation processes like soil fallowed are executed. The fruit production is of great importance in Turkey for this reason nurseries are developed (Yapıcı, 1992).

Since 2000 imports of fruit seedlings has increased tremendously in Turkey. For this reason, there are the needs to respond to fruit grower's to increase fruit seedlings production and establish more nursery enterprise. Root stock breeding gardens are inadequate in Turkey. Fruit seedlings used in production of root stock and scion breeding stock is due to inadequate of the firms to import more so that the gap is close. In the nurseries sector of Turkey, the ratio of exports to imports between 2007- 2010 was about 10%.

In 2010, the total production of certified fruit seedlings in 37 provinces of Turkey was 294 units. Fruit-vine and strawberry seedlings in terms of regional distribution, Mediterranean region is ranked first with 102 firms (BUGEM, 2013). In 2010, the production of certified vine fruit and strawberry seedlings was 63,618,586 units.

The Mediterranean region is the most important production site, the total production in 2010 was 25 million units and 39% on percentage basis. In the production of certified fruit plants in Turkey, Isparta province is ranked first with 21.20% share of the national total, follow by Bursa and Manisa with 11.10% and 9.10% respectively. This resulted in Isparta's location which lies between the Mediterranean and temperate climates. According to 2012 data, Isparta's total production of certified fruit seedlings was 4,629,665. Also the dense temperate fruit such as apples production, Isparta is the most production province in Turkey (BUGEM, 2013). Both national and international level of study on the economic structure of nursery is limited. The unit costs of lemon seedlings within public and private enterprises are TL 2.83 and TL 1.74 respectively (Demirtas, 2005). Production of healthy and certified nursery trees is one of the primary conditions for intensive and stable development of the fruit tree sector. The data showed that all the nurseries studied are profitable. On average basis, their net income is 20000 EUR/farm (Cakalli, 2012). Transplant timing did not affect the seedlings growth in the first year in the field. The retractable roof greenhouse has the potential

to produce two crops of seedlings in one growing season compared to one crop in the outdoor nursery. The estimated cost per seedling under retractable roof greenhouse was \$ 9.31, which was \$ 1.95 cheaper than outdoor (Wu, 2013).

In this study, the province of Isparta has performed immensely well in the production of certified temperate fruit species nurseries in Turkey. The cost and profit of the producing nursery, the problems with their respective solutions were identified in the enterprises with the same objectives carried out in the province of Isparta.

## **2. Materials and Methods**

### **2.1. Materials**

The study was carried out in the province of Isparta and other enterprises that manufacture certified fruit seedlings across the country. The complete counting method was used to obtain data from 75 enterprises. However, about 50 enterprises did not respond to our questions and data from them were not available in our findings. Secondary data of certified fruit seedlings enterprises was obtained from the Ministry of Food, Agriculture and Livestock Directorate in the Isparta Province of the Republic of Turkey. The primary data used in the research of fruit seedlings was obtained using questionnaire. The data used in the research for the production period between 2011 and 2012 was obtained between January to March 2013.

### **2.2. Methods**

The criterion for classification was done according to the size and production value of the enterprise. If the amount of production in the classification of agricultural enterprises is the criterion for a good size then occurring due to adverse weather conditions, fluctuations in production are considered to be exceptions. Because of the volume of production, process and resources (capital, labour and land) are directly related (Acil and Demirci, 1984). In this study, the classification of company size, number of certified fruit plants production is taken into account. Accordingly, the number of businesses for seedling production is divided into three groups which includes; I 1-40,000 business units, II 40,001-150,000 business units and in group III if the business units within the group is 150,001 units and over.

The enterprises were grouped according to survey conducted; group I having 38 enterprises, group II and III also having 7 and 5 enterprises respectively. The enterprises that engaged in the production of seedlings were active in various types of productions. Due to this reason, partial budget analysis method was used in the calculation cost items in the enterprises. The variable and fixed costs of the production of seedlings were identified within the enterprises. Due to attributes of the costs to only one production or the production activities which may be included in the group on account of the partial budget analysis conducted, all the costs were necessarily to be distinguished from the costs of the products. Many of the fixed costs do not have the ability to be distinguished, hence in the calculation the fixed costs of enterprises activities in the nursery; the gross value of production were jointly taking into account and the fixed costs components were multiplied. The production of fruit seedlings were evaluated with regards to economic consequences such as production costs; both variable and fixed costs are depicted in table 1.

**Table 1: Components of nursery production both variable and fixed costs**

Variable costs	Fixed costs
Propagation material	Plant establishment cost interest
Fertilization	Depreciation of fixed items (machinery, buildings, breeding facility, land reclamation)
Plant conservation	Buildings repair and maintenance costs
Irrigation	Documents and dues (seedlings producer's certificate, annual dues, plant inspection fee)
Temporary labour fee	Tax (machinery, real estate, land)
Machines for rents	Permanent-family labour costs
Repair and maintenance of tools and machinery	Rent and partnership share
Transportation and marketing	Debts interest
Saplings certification, labelling and checking fee	Value of bare land
Interest rates	General administrative expenditure

1 decatre = 0.1 hectare

The property used in the analysis of inputs used such as chemical fertilizers, pesticides, seeds is based on the price paid for. The calculation for mechanized power for costs based on prices of local units, machinery and equipment rental, fee for the driver was applicable. The activities costs, gross and absolute profit in the production of certified fruit plants per unit area was determined. In the study, the current average wages of family was identified as being used in the production activities labour cost. General and administrative expenditure is calculated by 3% of the total costs. The agricultural bank of Turkey calculates their credit interest rate for the period (10% by the year 2012) but 5% was considered in our research. The calculation of interest rate on fixed capital and the rented land value used as the

real interest rate is 5% (Erkus et al., 1995; Rehber, 2012). The calculation of gross and absolute profit of fruit seedlings per unit area is giving by; Gross Profit = Gross production value - Variable costs, Absolute Profit = Gross value of production - production costs and relative Profit = Gross value of production / Production costs (Acil and Demirci, 1984; Rehber, 1993; Kiral et al., 1999). Gross profit margin is calculated as gross profit divided by sales (Ceylan and Korkmaz, 2012).

### 3. Results and Discussion

#### 3.1. Socio-economic structure

From the 50 nursery enterprises examined according to their legal status structure, 14 percent is equity firm, 18 percent sole proprietorship, 4 percent was public enterprise and 64 percent accounted for cooperative partnership (table 2).

**Table 2: Legal structures of enterprises**

Types of enterprises	I. group		II. group		III. group		Total	
	N	%	N	%	N	%	N	%
Sole proprietorship	5	13.16	4	57.14	0	0.00	9	18.00
Public enterprises	1	2.63	1	14.29	0	0.00	2	4.00
Stock corporation	1	2.63	1	14.29	5	100.00	7	14.00
Cooperative partner	31	81.58	1	14.29	0	0.00	32	64.00
Total	38	100.00	7	100.00	5	100.00	50	100.00

The average age of individuals in the business is 45.32. The most experienced enterprise is group II when analysed based on year of establishment (table 3).

**Table 3: Average age of individuals and establishment dates of enterprises.**

Enterprises groups	Average age of individuals	Date of establishment of enterprises
I. group	46.74	2002.92
II. group	41.86	1991.86
III. group	39.40	2000.80
Average	45.32	2001.16

In the enterprises survey conducted, with respect to the individual educational status, 50% had their primary education, 18% completed junior high school, 10% graduated from senior high school, 4% had their pre-university education while 10% were undergraduate, graduate were 6%, and 2% had doctorate education. This is shown in table 4.

**Table 4: Individual educational status**

Education level	I. group		II. group		III. group		Total	
	N	%	N	%	N	%	N	%
Primary school	23	60.53	2	28.57	0	0.00	25	50.00
Junior high school	9	23.68	0	0.00	0	0.00	9	18.00
Senior high school	3	7.89	1	14.29	1	20.00	5	10.00
Pre-university	0	0.00	2	28.57	0	0.00	2	4.00
Bachelor's degree	2	5.26	0	0.00	3	60.00	5	10.00
Master's degree	1	2.63	2	28.57	0	0.00	3	6.00
Doctor's degree	0	0.00	0	0.00	1	20.00	1	2.00
Total	38	100.00	7	100.00	5	100.00	50	100.00

When analysed the enterprises according to land use patterns; nursery lands share is 58.94 decares, fruit land is 393.45 decares, and bare land is accounted for 16.28 decares while other land has 67.12 decares (table 5).

**Table 5: Land use patterns in the enterprises**

Enterprises groups	Nursery land	Fruit land	Bare land	Other lands	Total land
I. group	11.43	9.91	20.63	0.00	41.96
II. group	43.20	431.57	4.29	0.00	479.06
III. group	442.00	3255.00	0.00	671.20	4368.20
Average	58.94	393.45	16.28	67.12	535.78
Percentage (%)					
I. group	27.24	23.62	49.17	0.00	100.00
II. group	9.02	90.09	0.90	0.00	100.00
III. group	10.12	74.52	0.00	15.37	100.00
Average	11.00	73.43	3.04	12.53	100.00

In the enterprises surveyed, apple is the most production of certified fruit trees type (81.03%) which followed by cherry, peach-nectarine (table 6).

**Table 6: Kinds of nursery produced in enterprises**

Kinds of fruit nursery	I. group	II. group	III. group	The average of enterprises
				Units
Pears	264.47	1,771.43	15,574.00	2,006.40
Quinces	427.63	1,357.14	2,780.00	793.00
Almonds	289.47	4,830.00	100.00	906.20
Walnuts	65.79	400.00	0.00	106.00
Apples	9,230.79	69,232.86	473,478.00	64,055.80
Plums	915.79	7,322.86	7,258.00	2,447.00
Apricots	1,101.32	1,414.29	8,260.00	1,861.00
Cherries	1,707.37	2,472.86	19,078.00	3,551.60
Peaches	2,255.26	6,321.43	6,244.00	3,223.40
Others	94.21	200.00	0.00	99.60
Average	16,352.11	95,322.86	532,772.00	79,050.00
				Percentage (%)
Pears	1.62	1.86	2.92	2.54
Quinces	2.62	1.42	0.52	1.00
Almonds	1.77	5.07	0.02	1.15
Walnuts	0.40	0.42	0.00	0.13
Apples	56.45	72.63	88.87	81.03
Plums	5.60	7.68	1.36	3.10
Apricots	6.74	1.48	1.55	2.35
Cherries	10.44	2.59	3.58	4.49
Peaches	13.79	6.63	1.17	4.08
Others	0.58	0.21	0.00	0.13
Average	100.00	100.00	100.00	100.00

1 TL = 0.5273 US Dollars

### 3.2. Nursery economic analysis

#### 3.2.1. Gross value of production

In the enterprises surveyed, seedling production per unit area obtained from the gross production value was 6,095.17 TL/ decare and in group I, 5,134.92 TL/ decare while group II and III have 8,264.38 TL/ decare and 5,987.08 TL/ decare respectively (table 7).

**Table 7: Gross value of production in enterprises**

Groups of enterprises	Gross value of production	Land used for the production of seedlings	Gross value of production per unit area
	Value (TL)	Area (da)	Value (TL/da)
I. group	58,701.71	11.43	5,134.92
II. group	357,045.00	43.20	8,264.38
III. group	2,646,290.00	442.00	5,987.08
Average	359,228.60	58.94	6,095.17

### 3.2.2. Production cost

The average total cost of production is 104094.30TL, variable cost 40.17% out the total cost while 27.42% is for fixed cost (table 8).

Savas (2013) in Manisa, in a study on the economics of seedlings production the variable costs is 82.1% and 17.9% as fixed costs. According to the study mentioned, the ratio of variable costs has a higher share compared to that of fixed costs.

**Table 8: Production costs of seedlings in the enterprises**

Cost items in enterprises	I. group	II. group	III. group	The average enterprises
	Value (TL)			
Variable Cost	20,123.37	60,620.82	459,820.66	69,762.74
Fixed Cost	11,235.52	67,311.70	296,605.10	47,623.15
Interest on capital	3.821.66	124.503.67	359.668.08	56.301.78
Production Cost	27,915.80	101,104.35	687,236.77	104,094.30
	Proportional (%)			
Variable Cost	57.20	24.01	41.20	40.17
Fixed Cost	31.94	26.66	26.58	27.42
Interest on capital	10.86	49.32	32.23	32.42
Production Cost	100.00	100.00	100.00	100.00

### 3.2.3. Gross profit

In the enterprises surveyed, gross profit is TL 289,465.86, gross profit per unit area is 4,911.48 TL /decare (table 9).

**Table 9: Gross profit in the enterprises**

Groups of enterprises	Gross profit value (TL)	Gross profit per unit value (TL/da)
I. group	38,578.34	3,374.63
II. group	296,424.18	6,861.22
III. group	2,186,469.34	4,946.76
Average	289,465.86	4,911.48

### 3.2.4. Absolute and relative profit

Averagely, the absolute profit of the enterprises surveyed is TL 185,540.93. Enterprise group's absolute profit is highest in group III with TL 1,530,196.15 and lowest in group I with TL 23,521.16. The average relative profit was found to be 2.07. In other ways, in every TL



100 spending; group I made a profit of TL 67, group II TL 41 while group III come out with TL 137 (table 10).

**Table 10: Absolute and relative profit in the enterprises**

Groups of enterprises	Absolute profit	Absolute profit	Relative profit
	Value (TL)	Value (TL/da)	Proportional
I. group	23,521.16	2,057.51	1.67
II. group	104,608.81	2,421.34	1.41
III. group	1,530,196.15	3,461.98	2.37
Average	185,540.93	3,148.14	2.07

### 3.2.5. Production cost and profit per unit

The cost and profit per unit of the enterprises is depicted in table 11. Production cost is obtained as total cost divided by total units of seedlings. In enterprise one seedling production cost was calculated as TL 2.20. The least cost of production per seedling was found in group III and the highest was in group I. Per seedling selling price was calculated as TL 4.54 averagely in enterprises. The lowest price of selling per seedling was found in group III and the highest was in group I. Per seedling gross profit margin and net profit margin was calculated as TL 0.81 and TL 0.52 respectively. According to these indicators, group III has greater advantage compare to other groups.

**Table 11: Cost and profit per unit in the enterprises**

Items	I. group	II. group	III. group	Average
	Value (TL/ unit)			
Production cost	2.15	2.65	2.09	2.20
Selling price	3.59	3.75	4.97	4.54
Gross profit margin (TL)	0.66	0.83	0.83	0.81
Net profit margin (TL)	0.40	0.29	0.58	0.52

### 3.2.6. Working capital turnover

Working capital turnover of seedlings enterprise generated from the gross value of production per total assets capital invested in arboriculture, the working capital turnover of nursery enterprises is calculated as 0.31 as can be seen (table 12).

**Table 12: Working capital turnover**

Enterprises groups	Gross value of production value (TL)	Total assets capital invested in arboriculture value (TL)	Working capital turnover
I. group	58,701.71	84,892.18	0.69
II. group	357,045.00	2,542,787.62	0.14
III. group	2,646,290.00	7,406,861.64	0.36
Average	359,228.60	1,161,194.49	0.31

### 3.2.7. Nursery enterprises current and future state

According to data obtained, the nursery sector is in poor condition (2.42) currently, the future is moderate (2.96) as indicated table 13. In the third group, the future of the big nursery enterprises sector is positive (3.80) when evaluated, the first and second groups involved in the future of the nursery sector as medium when assessed.

**Table 13: Nursery enterprise situations now and future**

	I. group	II. group	III. group	Average
Nursery situation (currently)*	2.29	3.00	2.60	2.42
Nursery situation (future)*	2.82	3.14	3.80	2.96

\*Scale; Worst:1, Bad:2, Moderate:3, Good:4, Very good :5

### 3.2.8. Related problems faced by nursery enterprises

Arboriculture sector assessment after surveyed; marketing (4.16) is the major problem and the supply of labour (1.98) is said to be an insignificant problem in all the groups. In the third group imports and exports (4.40) is said to be the major problems in the enterprises, other enterprises groups have declared that they remain undecided on this assessment (table14).

**Table 14: Problems of the nursery enterprises sector**

Problems of the sector*	I. group	II. group	III. group	Average
Certification	2.63	3.57	2.80	2.78
Supply of breeders materials	2.82	3.71	4.40	3.10
Provision of credit	3.34	2.71	3.00	3.22
Marketing	4.29	3.71	3.80	4.16
Diseases and pests	2.16	2.71	2.20	2.24
Import and export	2.11	2.43	4.40	2.38
Labour supply	1.92	2.14	2.20	1.98

\*Scale; Very insignificant:1, Insignificant:2, Undecided:3, Important:4, Very important:5

#### 4. Conclusions

In conclusion, the properties of plant seedlings to be used in orchards should have directly effects on fruit trees grown. The main feature for the provement of seedlings quality is the botanical names of the fruit under cultivation and is necessary to be established in the orchards. Due to geographical location of Turkey in the world which has the favourable climatic conditions for the production of temperate fruit many regions are into high production.

The functioning of the economy is required to have sufficient knowledge about forming the basis of fruit tree nurseries which can be made quickly and efficiency in the production processes.

Marketing as a branch of every production sector is a major problem in arboriculture. Generally, the producer has negative effects on the final consumer which occurred in phases. Due to the market failure of seedlings, the producer is not satisfied financially as required. In addition, large-scale companies determine the market to prices, branding and small firms are few and their production is not something to write home about due high cost of production and that causes instability in the selling price of seedlings. To eliminate this situation and to improve efficiency in the production, small-scale producers in unfair competition and exhibition work should be supported.

All these problems can be solved in the marketing required by development of policies. In order to ensure the sustainability of production and to prevent leakage, the producers should have adequate infrastructure in the region which is necessary to establish a good seedling market.

The production of breeding material supply which are necessary for production, poses a significant problem in arboriculture. The needed import breeding materials should be made available for the producers. This situation makes the arboriculture sector outward-bound. Intensive support should be provided in order to develop the production sector of seedlings in the production regions such as; the establishment of tissue culture laboratory, supply of breeding material.

There is no support for the seedlings producers in Turkey and farmers are already using certified fruit seedlings in their production. In this case, the use of certified fruit seedlings is an important issue to take into consideration. Sufficient support must be given to production of

certified fruit plants and the use of healthy seedlings for the sustainability of fruit plants production. There should be support to both buyers and sellers of seedlings because the buyer the support into consideration before buying. Support given to increasing the number of uncertified products that might obstruct the production of certified ones should be measured.

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