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Analysis on Traditional Homegarden Involving Animals Practices and Its Importance Classification of Usage Purposes in Rural Areas of Isparta Region of Turkey

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Abstract: This study was prepared for performing some analyses on traditional homegardens involving animals practices located in rural areas of Isparta region and designating the priorities in the intended use of homegardens. As a result of the regression analysis, conducted for the purpose of designating the share of the cash income obtained from homegardens as well as the monetary value of the products used for household consumption upon being produced in homegardens within the annual income, the share of the income obtained from traditional homegardens in the rural areas of Isparta region was designated as 34.50%. In the land observations, the degree of importance of the contributions provided by homegardens to the locals was investigated and it was identified that the most important contribution of homegardens was fulfilling the food supply of the household, with a share of 27.89%. Other contributions include, in order of importance, food security, house requirements, corral and barn for livestock, fruit production, commercial production, aesthetics and ornamentation importance, biodiversity, habitats for wildlife, forest product production, apiculture and others.

Key words: Agroforestry, traditional homegarden, analysis, Isparta region, Turkey

INTRODUCTION

Agroforestry is a well-known topic for locals in rural areas of our country, while it has been gaining importance in recent years for universities and research institutes. Furthermore, studies analyzing agroforestry applications and production techniques have been made on a regional and national levels (Ayberk, 1992; Turna, 1992; Sefik, 1995; Turna and Acar, 2001; Filiz, 2002; Filiz and Tolunay, 2003; Tolunay *et al.*, 2005; Tolunay *et al.*, 2007a, b, 2009a-d; Turna, 2007; Ayhan *et al.*, 2009). Despite all these studies, not sufficient researches have been made on the processing, application and the economics of each production technique.

Traditional homegardens and traditional homegardens involving animals in Turkey are among these production techniques which have not been sufficiently studied. Furthermore, in the studies regarding traditional homegardens, it has generally been aimed to define homegardens and identifying their functions without including economic analysis (Turna and Acar, 2001). Moreover, not sufficient quantitative data are available regarding homegardens.

Hoogerbrugge and Fresco (1993) defined traditional homegardens as a small scale, supplementary food production system by and for household members that mimics the natural, multilayered ecosystem.

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According to Kumar and Nair (2004), the concept of homegardens refers to intimate, multi-story combinations of various trees and crops, sometimes in association with domestic animals, around homesteads.

Traditional homegardens may be defined as gardens of private property as part of a soil/land comprising a house with people living inside, where a mixture of annual and perennial plants and wood-like species for other requirements (such as wood for building, burning, shading, etc.) and various ornamental plants are grown for aesthetics purposes so as to fulfill primarily the food supply of the household. Whereas, traditional homegardens involving animals may be defined as growing various trees, small trees, shrubs and similar wood-like species and agricultural products with animals (Tolunay, 2008).

Traditional homegardens, which have many social, economic, ecological, cultural and aesthetic functions (Soemarwoto and Conway, 1992; Wezel and Bender, 2003; Abdoellah *et al.*, 2006) used to be an important land use method applied by the families in rural areas solely for their own consumption. Although, it was very difficult in those periods to deliver agricultural products in rural areas to the consumers living in cities, the development of the country over time as well as the settlement of infrastructural problems especially in rural areas provided the opportunity to the locals of rural areas to travel more frequently to and from cities. This has enabled the products in rural areas to be delivered more easily to the markets in the cities.

On the other hand, the changes in the nutritional attitudes of the population living in the cities have brought ecological agricultural products to the forefront. These people have regarded the products from rural areas within the scope of ecological products and directed their consumption demands towards these products. Hence, the products grown by the peasants in rural areas have become more preferable, so much that ecological product markets where products coming only from rural areas began to be set up in the cities.

The prices of products obtained from traditional homegardens in rural areas are higher than the products grown in other environments. This has enabled the people in rural areas to gain more income. Traditional homegardens ranges from an area of 1-2 m² to 3 ha (Mitchell and Hanstad, 2004) have begun to provide income safety in addition to the daily consumption of a family.

Thus, the migration of a major portion of the locals in rural areas, who are poor and need to seek jobs and make a living in the city, has been prevented. This has become the salvation of the people who carries the rural poverty to the suburbs of these cities and have to carry on living under very difficult conditions. Today, the people in rural areas ensure their food security and also obtain significant income by these implementations.

MATERIALS AND METHODS

This study was conducted from 12.09.2007 to 08.07.2009 in Isparta, Turkey. From September 12, 2007 to January 9, 2009, the concept of the research project and questionnaire form was developed. With the scope of research project, land observations and questionnaire form was applied in the rural areas of Isparta region between 10.01.2009-10.05.2009. From May 10, 2009 to July 8, 2009, the data's were analyzed.

Description of Research Area

The region of Isparta, located in the North of the Mediterranean region, has an average altitude of 1,050 m and is at 37° 18' and 38° 30' North latitudes and 30° 20' and 31° 33' East longitudes. The population of the Region consists of 407,463 people according to 2008 data.

The average annual temperature has been 12°C for many years. The coldest months of the year are January-February, where the average daily temperature varies between 1.8-2.6°C. July and August are the warmest months where the average daily temperature varies between 23.5-22.9°C. The highest temperature value (41.2°C) in the region was recorded on 06.08.2008, while, the lowest temperature value (-21.0°C) was recorded on 03.02.1974 (Anonymous, 2009).

In the region of Isparta, where the average annual precipitation is 553.1 kg m⁻² (Anonymous, 2009), 72.69% of the rainfall occurs in winter and spring months. The summer and autumn months are dry where 23.31% of the total rainfall occurs in these months. The annual precipitation decreases from the South towards the North of the region.

Methods

Diagnosis and Design Methodology (D and D)

The D and D is a methodology for the diagnosis of land management problems and the design of agroforestry solutions (Raintree, 1987). It was developed by International Council for Research in Agroforestry (ICRAF) to assist agroforestry researchers and development fieldworkers to plan and implement effective research and development projects (Nair, 1993).

The D and D, which is used for defining land use systems and investigating production techniques, is composed of 5 phases. The first phase of the technique, called Prediagnostic, defines the land use systems and designates the mode of operation of the systems. In the Diagnostic phase, the problems preventing a better functioning of the systems and proposals are developed for the solution of these problems. In other words, the production system is tackled once again and is planned. The diagnostic stage is completed when general specifications for the suggested candidate technologies have been identified. Whereas, the design and evaluation phase, involves implementations directed towards the solution of the problems in the production system. The basic procedures of D and D consist of 5 stages was shown in Table 1.

The D and D methodology offers a possible set of procedures for a logical and step-wise approach to the evaluation of land-use systems, through a pre-diagnostic analysis, a rapid field appraisal of selected land-use systems and additional focused surveys of how a system

Table 1: Basic procedures of the Diagnosis and Design (D and D) methodology

D and D stages	Basic questions to answer	Key factors to consider	Mode of inquiry
Prediagnostic	Definition of the land use system and site selection (which system to focus on?)	Distinctive combinations of resources, technology and land user objectives	Seeing and comparing the different land use systems
	How does the system work? (How is it organized, how does it function to achieve its objectives?)	Production objectives and strategies, arrangement of components	Analyzing and describing the system
Diagnostic	How well does the system work? (What are its problems, limiting constraints, problem-generating syndromes and intervention points?)	Problem is meeting system objectives (production shortfalls, sustainability problems)	Diagnostic interviews and direct field observations.
Design and evaluation	How to improve the system? (What is needed to improve system performance)	Causal factors, constraints and intervention points Specifications for problem solving or performance enhancing interventions	Troubleshooting the subsystems problem Iterative design and evaluation of alternatives
Planning	What to do to develop and disseminate the improved system?	Research and development needs, extension needs	Research design, project planning
Implementation	How to adjust to new information?	Feedback from on-station research, on-farm trials and special studies	Rediagnosis and redesign in the light of new information

works. These are integrated within an analysis of system constraints highlighting potential key interaction or leverage points. Solutions to improve the system can then be focused on these points. Possible improvements can include not only agroforestry, but also agronomic, forestry and other possible interventions, for an objective comparison (Tolunay *et al.*, 2009d).

In the study, the prediagnostic phase, which is the first stage of the D and D, was used for the designation of the economic components of homegardens, annual income distribution of the locals, income distribution obtained from traditional homegardens and determination of the usage purposes of homegardens.

Sample Selection

Traditional homegarden practices involving animals in the rural areas of Isparta Region, which constitute the subject matter of this research, was recorded with the Questionnaire Form. The number of questionnaires to be applied was calculated with the simple random sampling method presented below (Cicek and Erkan, 1996).

$$n = \frac{N \times \sigma^2}{(N-1) \times D^2 + \sigma^2} \quad (1)$$

The explanations of the abbreviations are provided below:

- n = No. of samples
- N = No. of population or main group
- σ^2 = Variance of population
- D = $(d/t)^2$
- d = A certain rate of deviation (5%) from the average
- t = t table value (1.96) corresponding to the limit of the confidence interval 95%

The population living in rural areas of Isparta Region was designated as 142,608 people according to 2008 data. Furthermore, the total number of houses in rural areas of Isparta Region was designated as 42,553 according to general census of 2000. Based on these figures, the number of questionnaires required to be applied according to the population was calculated as 383, whereas the number of questionnaires required to be applied according to the house number was calculated as 380. However, in land studies, 443 questionnaires were applied for the purpose of attaining more accurate and reliable results.

Questionnaires and Data Collection

Questionnaire form was applied in the investigation area between 10.01.2009-10.05.2009. Investigations were done in a total of 160 townships and villages in 13 provinces of Isparta Region and it was aimed to reach all villages as much as possible in order to achieve homogeneity among districts. The townships and villages where the questionnaires were applied selected randomly.

Quantitative and qualitative data was obtained with the application of questionnaires regarding the annual income status of local people, commercial vegetable and animal production level in traditional homegarden involving animals, costs made throughout the year in homegardens, the extent to which the products in homegardens are sold at markets and dairy farms and the contribution provided by homegardens to the household and the region.

The questionnaires were implemented firstly in the town of Aksu at a small scale and the deficiencies in the questionnaire as well as the topics which were misunderstood was corrected after then. Furthermore, in order to prevent any unanswered questions, the questionnaire was applied face to face with the locals. The questions of the questionnaire was prepared in a simple language and the views of the individuals was determined with open-ended and multiple choice questions. Especially in the question regarding the designation of the ranking of importance of the usage purposes of traditional homegarden was given to the respondents themselves and the question was replied by the relevant respondent.

Estimation of Annual Opportunity Cost of Household Labor

The activities in traditional homegardens are done by household members. Therefore, these persons spend their time in their gardens and cannot be involved in other lines of business. The income to be gained by household members if they work in a place other their homegarden was regarded as opportunity cost.

In the land observations of Isparta region, it was determined that no activity was conducted by household members in their homegardens between November-April (except for those with greenhouses), due to the climate features of the region. The activities conducted in homegardens begin in May and continue until the end of October. Thus, labor opportunity costs were calculated on the basis of 6 months which is the working period in homegardens.

In the interviews done with the locals, it was determined that household members go to towns and provincial centers at least once a week for following up their personal business and therefore they do not conduct any activity in their homegarden on that day. Therefore, 1 week was evaluated as 6 days and the annual working period in homegardens was calculated as 156 days.

The number of household members in the rural regions in the investigation area varies from 4-5 according to the findings. In order to obtain an objective result in the study, the minimum wage was taken as basis and the daily labor fees was calculated according to the net daily minimum wage of a married person with a working spouse and three children.

Eight hours was taken as basis the daily working period and therefore the daily net minimum wage was calculated as € 9.19. Hence, the annual workforce opportunity cost for each homegarden was calculated with the help of the following special formula:

$$OC_{HL} = \frac{t \times 9.19}{8} \times 156$$

Where:

OC_{HL} = Opportunity cost of household labor in a year

t = Working time in a homegarden in a day

The annual labor opportunity costs were calculated according to the annual working period and they were added to the average annual cost items of homegardens. On the other hand, business lines with a higher pay than the minimum wage thus providing a higher pay are also presented as an alternative.

Data Analysis

The analysis of the data obtained via questionnaires was analyzed by using the statistical program SPSS 15.0 and microsoft office excel.

The following research techniques were also used within the scope of the study in addition to the methods described above:

- **Literature and Document Analysis:** Theses, articles, researches, projects and similar scientific studies related with the subject matter of the research were investigated. Furthermore, information and documents were collected from some public and private institutes
- **Land Observations and Interviews:** Land observations and interviews were done with the application of questionnaires

Chi-Square test and correlation analysis were used to analyze whether the income obtained from homegardens differs depending on the change in the area of the homegarden. Whereas, regression analysis was performed for designating the share of the cash income obtained from homegardens and the monetary value of the products produced at homegardens and used in household consumption within the total annual income obtained by the locals.

RESULTS AND DISCUSSION

Annual Economic Components of Traditional Homegardens of Isparta Region

Economic components were used for designating the income and cost items of traditional homegardens within their annual economic cycle and for calculating their cash flow in association with these items. Mohan (2004) also, used similar components for designating annual financial cycle of Kerala Homegardens.

In addition to the income items, the costs made by the household during one year in their homegardening activities for fertilizers, seeds and saplings, animal feed, hired labor force, maintenance, etc. were identified and the fees paid were recorded.

The annual economic components of traditional homegardens were designated according to land observations and the interviews done with the household in rural areas and shown in Table 2.

Average Annual Net Cash Flow of Traditional Homegardens of Isparta Region

In the study, the annual income obtained from homegardens analyzed within the scope of annual economic components and the annual costs for these gardens were identified. The averages for the annual income, annual costs and cash flow were shown in Table 3 according to their area group.

Table 2: Annual Economic Components of Traditional Homegardens of Isparta Region

Inputs	Outputs
Fertilizer cost	Agricultural products (vegetable, fruit, etc.)
Seed and sapling cost	Animal products (milk, meat, egg, etc.)
Animal feed cost	Forest products (round wood and fuel wood, etc.)
Hired labor cost	Medicinal products
Maintenance cost	Intangible benefits (environmental benefits such as soil and water conservation, carbon sequestration etc.)
Opportunity cost of household labor	
Other cost (transportation, electric and irrigation fees, hedge, cultivation, etc.)	

Table 3: Average annual net cash flow of traditional homegardens of isparta region

Area group	Average annual income	Average annual cost -(€)	Average annual net cash flow
0-100 m ²	3170.19	762.38	2407.81
101-250 m ²	1726.65	1022.62	704.03
251-500 m ²	2419.34	1848.07	571.27
501-1000 m ²	3319.69	2044.43	1275.27
>1000 m ²	4682.99	3308.27	1374.72

€ : Euro

Table 4: Distribution of annual total income of rural household of isparta region

Total annual income (€)	Frequency	Percent	Cumulative percent
0-2.500	126	28.44	28.44
2.501-5.000	121	27.31	55.75
5.001-12.500	136	30.70	86.45
12.501-25.000	48	10.84	97.29
>25.000	12	2.71	100
Total	443	100	

Table 5: Distribution of annual income obtain from traditional homegardens of Isparta region

Annual income obtain from homegardens (€)	Frequency	Percent	Cumulative percent
0	161	36.34	36.34
1-2.500	91	20.54	56.88
2.501-5.000	106	23.93	80.81
5.001-7.500	34	7.67	88.48
7.501-10.000	27	6.10	94.58
>10.000	24	5.42	100
Total	443	100	

The reason for the high annual average income in homegardens at an area of 0-100 m² was the use of these gardens mostly for feeding animals in addition to fruit and vegetable production and the high income obtained from the sales of these animals.

Chi-Square Tests, Correlation and Regression Analyses of Traditional Homegardens of Isparta Region

In the analysis, the economic values of vegetables, fruits and animal products produced in traditional homegardens of Isparta region were evaluated on the basis of average existing market sales prices. Mohan (2004) also used existing market prices for determination the values of the products. However, the external benefits provided by homegardens such as soil and water conservation, carbon sequestration, environmental health, aesthetic, socio-cultural benefits, benefits provided from a security perspective, etc. did not calculated in this study. The annual total income obtained by the household living in rural areas of Isparta Region was identified in the interviews and shown in Table 4.

In Table 5, the income obtained from homegardens in 161 households was demonstrated as € 0. This was due to the absence of any agricultural or animal production activities in the garden of 8 households, while the agricultural and animal products produced by the other 153 households were not placed on sale on the market. Furthermore, various district markets in the Isparta region were visited to designate the average sale price of vegetables, fruits and animal products. The income was calculated upon multiplying the production amount of products produced in traditional homegardens but not sold to local markets, with the average market sales prices.

As a result, even though household members do not sell the products in markets, no money is paid for obtaining these products. Therefore, the calculated value was evaluated as the income of the homegarden. In this case, the income obtained from homegardens was redistributed in Table 6.

Table 6: Distribution of Annual Income Obtain From Traditional Homegardens of Isparta Region

Annual income obtain from homegardens (€)	Frequency	Percent	Cumulative percent
0	8	1.81	1.81
1-2.500	240	54.18	55.99
2.501-5.000	110	24.83	80.82
5.001-7.500	34	7.67	88.49
7.501-10.000	27	6.09	94.58
>10.000	24	5.42	100
Total	443	100	

Table 7: Chi-square tests

Statistical analysis	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-square	70.840 ^a	20	0.000
Likelihood ratio	72.777	20	0.000
Linear-by-linear association	0.733	1	0.392
No. of valid cases	443		

a. 13 cells (43.3%) have expected count less than 5. The minimum expected count is 0.78

Table 8: Distribution of annual income obtain from homegardens according to area groups

Area of the homegardens	Annual income obtain from homegardens							
	€ 1-2.500	Percent	€ 2.501-5.000	Percent	€ 5.001-7.500	Percent	€ 7.501-10.000	Percent
0-100 m ²	26	60.47	3	6.98	3	6.98	4	9.30
101-250 m ²	32	71.11	6	13.33	3	6.67	2	4.44
251-500 m ²	49	65.33	12	16.00	6	8.00	4	5.33
501-1.000 m ²	77	62.10	28	22.58	6	4.84	8	6.45
>1.000 m ²	56	35.90	61	39.10	16	10.26	9	5.77
Total	240		110		34		27	

Area of the homegardens	Annual income obtain from homegardens					
	>€ 10.000	Percent	€ 0	Percent	Total	Percent
0-100 m ²	3	6.98	4	9.30	43	100
101-250 m ²	0	0.00	2	4.44	45	100
251-500 m ²	2	2.67	2	2.67	75	100
501-1.000 m ²	5	4.03	0	0.00	124	100
>1.000 m ²	14	8.97	0	0.00	156	100
Total	24		8		443	

In Table 7, it was analyzed with Chi-Square Test whether the income obtained from homegardens varies according to the size of the area and a pearson Chi-Square coefficient of 70,840 was found significant at a confidence level of 95% and it was understood that there was a positive association between the area of homegardens and the income obtained from homegardens.

It was evaluated with a correlation analysis whether the income obtained from homegardens differs depending on the size of the area and Pearson correlation coefficient (0,041) was found significant however, we understood that there was a positive yet very weak link between the area of homegardens and the income obtained from homegardens. This was mainly due to the fact that the primary purpose of traditional homegardens in the rural areas of Isparta Region is to fulfill the food requirements of households and ensure food security.

The distribution of the segments of the income obtained from homegardens based on the size of the homegarden and percentiles was shown in Table 8. In Table 8, it was designated that the income obtained from homegardens covering an area smaller than 1,000 m² varies between € 1-2,500.

Table 9: Distribution of income obtain from homegardens in towns

Annual income obtain from homegardens								
Town name	€ 1-2.500	Percent	€ 2.501- 5.000	Percent	€ 5.001-7.500	Percent	€ 7.501-10.000	Percent
Gelendost	9	25.00	7	19.44	7	19.44	3	8.33
Yalvaç	40	50.00	21	26.25	8	10.00	6	7.50
Sütçüler	42	77.78	4	7.41	1	1.85	2	3.70
Senirkent	6	75.00	2	25.00	0	0.00	0	0.00
Merkez	29	59.18	16	32.65	1	2.04	2	4.08
Gönen	5	29.41	8	47.06	1	5.88	3	17.65
Keçiborlu	15	71.43	4	19.05	0	0.00	2	9.52
Uluborlu	4	44.44	4	44.44	0	0.00	0	0.00
Atabey	5	41.67	4	33.33	3	25.00	0	0.00
Şarkikaraağaç	34	69.39	7	14.29	1	2.04	4	8.16
Yenişarbademli	11	61.11	7	38.89	0	0.00	0	0.00
Eğirdir	13	25.00	21	40.38	9	17.31	4	7.69
Aksu	27	71.05	5	13.16	3	7.89	1	2.63
Total	240	54.18	110	24.83	34	7.67	27	6.09

Annual income obtain from homegardens						
Town name	>€10.000	Percent	€0	Percent	Total	Percent
Gelendost	8	22.22	2	5.56	36	100
Yalvaç	5	6.25	0	0.00	80	100
Sütçüler	2	3.70	3	5.56	54	100
Senirkent	0	0.00	0	0.00	8	100
Merkez	1	2.04	0	0.00	49	100
Gönen	0	0.00	0	0.00	17	100
Keçiborlu	0	0.00	0	0.00	21	100
Uluborlu	1	11.11	0	0.00	9	100
Atabey	0	0.00	0	0.00	12	100
Şarkikaraağaç	3	6.12	0	0.00	49	100
Yenişarbademli	0	0.00	0	0.00	18	100
Eğirdir	3	5.77	2	3.85	52	100
Aksu	1	2.63	1	2.63	38	100
Total	24	5.42	8	1.81	443	100

It was observed that 39.53% of the income obtained from homegardens of less than 100 m² was above € 2,500. This was due to the high income obtained from the sale of animals fed in these gardens as well as animal products.

In homegardens larger than 500 m² an increase occurred in the share of the € 2.501-5.000 group in terms of the income obtained. Especially, in homegardens larger than 1.000 m². It was observed that the share of the income group ranging from € 1-2.500 was dropped and thus the share of the income group ranging between € 2.501-5.000 in the total income led with 39.10%.

In Table 9, in the distribution of the income obtained from traditional homegardens in Isparta Region, the income group ranging between € 1-2,500 was placed on the first position with 54.18% within the total income. The income group ranging between € 2,501-5,000 was placed second with a rate of 24.83%. The percentage of income decreased as the income tier increased.

In the consideration of the income obtained from gardens on a town basis, it may be observed that especially the income in the Town of Gelendost was distributed to all income tiers. The income obtained from the gardens in the Towns of Yalvaç, Sütçüler, Senirkent, Merkez, Keçiborlu, Şarkikaraağaç, Yenişarbademli and Aksu was concentrated in the income group ranging between € 1-2,500 at a rate of 50% and above.

Whereas, in the Towns of Gönen and Eğirdir, the percentage of homegardens was high, this provided an income ranging between € 2,501-5,000. The income obtained from the

Table 10: ANOVA^b

Model 1	Sum of squares	df	Mean square	F-vales	Sig.
Regression	178.192	1	178.192	232.293	0.000 ^a
Residual	338.291	441	0.767		
Total	516.483	442			

^aPredictors: (Constant), Income from homegarden. ^bDependent variable: Annual total income

Table 11: Model summary^b

Model 1	Values
Statistical analysis	
R	0.587 ^a
R ²	0.345
Adjusted R ²	0.344
SE of the estimate	0.87584
R ² change	0.345
F change	232.293
df 1	1
df2	441
Sig. F change	0.000
Durbin-Watson	1.083

^aPredictors: (Constant), Income from homegarden. ^bDependent variable: Annual total income

homegardens in these towns has a rate of 47.06 and 40.38%, respectively. In the Towns of Atabey and Uluborlu, it was observed that a major portion of the income obtained was concentrated in the income groups ranging between € 1-2,500 and € 2,501-5,000. In the Towns of Gelendost, Sütçüler, Eğirdir and Aksu, no income was obtained from the gardens of 8 homegardens as no activity was conducted in them.

In the Town of Uluborlu, the income obtained from gardens was equally distributed between the income groups ranging between € 0-2,500 and € 2,501-5,000. There were no homegardens providing an income higher than € 5,000 in Senirkent and Yenişarbademli, higher than € 7,500 in the town of Atabey and higher than € 10,000 in the towns of Gönen and Keçiborlu.

In Table 10, as a result of the regression analysis conducted between the annual income and the income obtained from homegardens, $F = 232,293$ was found and a significant relation was found at a confidence level of 95% between the annual income and the income obtained from homegardens.

Méndez *et al.* (2001) reported that homegardens primarily used for subsistence purposes of the household, in addition to that they are also being used to generate cash income. Similar to that, in rural areas of Isparta Region, household members obtain income as a result of the sales of the crops and animal products produced in homegardens at local markets and dairy farms. Also, the products are used for household consumption therefore household members do not buy these products from local markets. Thus, no expense is made by household members for these products. In addition, no homegardens obtaining income from medicinal products and forestry products was encountered.

In Table 11, as a result of the regression analysis conducted for the purpose of identifying the share of cash income obtained from homegardens and the monetary value of the products used in household consumption upon being produced in homegardens within the annual income, it was designated that there was positive medium level association with a coefficient of 0.587 at a confidence level of 95% between the total annual income and the income obtained from homegardens and R-squared value was calculated as 0,345.

Table 12: Coefficients^a

	Unstandardized coefficients		Standardized coefficients			95% Confidence interval for B		Correlations	
	B	SE	Beta	t-value	Sig.	Lower bound	Upper bound	Zero-order	Partial Part
Model 1 (Constant)	1.380	0.074		18.541	0.000	1.234	1.526		
Income from Homegarden	0.497	0.033	0.587	15.241	0.000	0.433	0.561	0.587	0.587

This value expressed the fact that 34.5% of the change in the annual income may be explained with the income obtained from homegardens whereas the remaining part of 65.5% reflected the need for other variables. In other words, the share of the income obtained from traditional homegardens in the rural areas of Isparta Region within the annual income was designated as 34.50%. Soemarwoto (1987) reported that the share of the income obtained from homegardens in total income ranges between 6.6%-55.7% depend on homegarden size, household requirements and species diversity.

In Table 12, it was determined that an increase of one unit in the income obtained from homegardens increases the total annual income by 0,497 units. As the t-value (15,241) relating to this coefficient was regarded as significant at every level (significant = 0,000). The coefficient of the variable of the income obtained from homegardens was statistically significant. The estimated result of the said model was presented below:

$$y = 1.380 + 0.497x \tag{3}$$

Where:

y = Total annual income,

x = Income obtained from homegardens

Importance Classification of Usage Purposes of Traditional Homegardens of Isparta Region

The locals was requested to rank the usage purposes of homegardens from 1 to 12 according to their level of importance so as to designate the order of importance of the usage purposes of traditional homegardens in the rural areas of Isparta region.

The weighted arithmetic average of the usage purposes of traditional homegardens was considered in order of preference and the usage priorities of traditional homegardens was designated according to the ranking of the score obtained. The preference ranking of each usage purpose was multiplied with the number of preference for the weighted arithmetic average and the points were determined upon dividing it to the total number of questionnaires. Consequently, the mathematical reverse of these points was calculated. Thus, the point of the most preferred usage purpose was the highest point. The ranking of was obtained upon calculating the percentage of the values obtained.

According to the result of the study, the usage purposes of traditional homegardens for households was determined as follows in order of importance; household food supply, food security, house requirements, corral and barn for livestock, fruit production, commercial production, aesthetics and ornamentation importance, biodiversity, habitats for wildlife, forest product production, apiculture and others. The ranking of importance of the usage purposes of traditional homegardens and their percentiles was shown in Fig. 1.

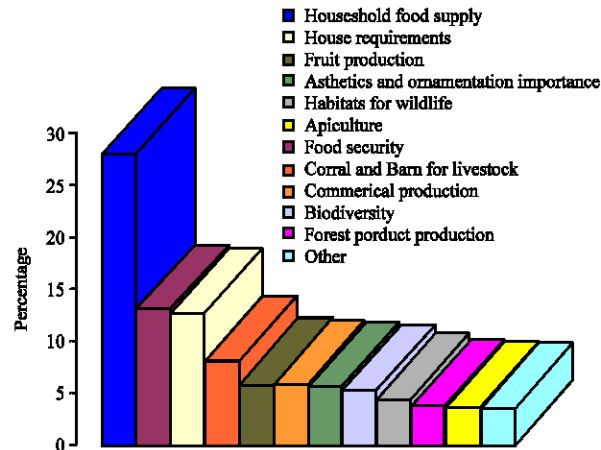


Fig. 1: Importance classification of usage purposes of traditional homegardens of Isparta region

CONCLUSIONS

Traditional homegardens, which are accepted as one of the sustainable Agroforestry systems across the world (Nair, 2001; Kumar and Nair, 2004; Abebe, 2005; Peyre *et al.*, 2006), provide a major contribution to locals in ensuring food security and obtaining additional income in rural areas. Furthermore, the society may continue its existence with intra-familial solidarity during social and economic crises. Within this scope, traditional homegardens help the locals to survive crises upon ensuring food security to households, providing additional income and other contributions.

Herbaceous and wood-like plants grown by agricultural production in traditional homegardens and animal products such as meat, milk and eggs are used primarily for fulfilling the food requirement of the household and ensuring food security. Only surplus products are sold and local markets and dairy farms.

In the analyses it was determined that no production was conducted in 1.81% of traditional homegardens, that in 34.53% the agricultural and animal products were used only for household consumption and that in 63.66% agricultural and animal products were sold in local markets and dairy farms.

Moreover, the average market sales prices of herbaceous products and the dairy farm sales prices of animal products was detected upon visiting various district markets in the Isparta Region. The income was calculated upon multiplying the production amount of products produced in traditional homegardens but not sold in local markets and dairy farms with the average market and dairy farm sales prices. As a result, even if household members do not place on sale the products they have produced, they do not pay any money for the procurement of the products they have produced. Therefore, the calculated value was evaluated as the income of the homegarden.

In the analysis it was determined an income ranging between € 1-2,500 was obtained from 54.18% homegardens through agricultural and animal products produced in traditional homegardens, €2,501-5,000 was obtained from 24.83%, €5,001-7,500 was obtained from 7.67% € 7,501-10,000 from 6.09% and an income above € 10,000 was obtained from 1.81%. In addition, in case similar studies were conducted in other areas of Turkey it was estimated that regional similarities and differences will arise.

As a result of the regression analysis conducted for the purpose of designating the share, within the annual income, of the cash income obtained from homegardens and the monetary value of the products used in household consumption upon being produced in homegardens, it was determined that the income obtained from traditional homegardens in rural areas of Isparta Region have a share of 34.50% within the annual income.

In the land observations, the degree of importance of the contributions provided by homegardens to the locals was investigated and it was identified that the most important contribution of homegardens was fulfilling the food supply of the household, with a share of 27.89%. Other contributions include, in order of importance, food security, house requirements, corral and barn for livestock, fruit production, commercial production, aesthetics and ornamentation importance, biodiversity, habitats for wildlife, forest product production, apiculture and others.

As it may be understood from the results of the analysis, in addition to providing nutritional and food security of the locals in rural areas, homegardens, which constitute an additional source of income for the household, have a major function also in the prevention of the migration of the population in rural areas to cities. 25% of the Turkish population lives in rural areas and looking back at the last 50 years, it may be seen that a significant part of the population from the rural areas of Turkey has migrated to cities for the purpose of obtaining a higher income and living in better conditions.

Only a limited portion of the population that has migrated could join the industrial and service sectors whereas the remaining portion lives off by marginal occupations such as street trading, peddling, shared taxi attendants. Nowadays, the persons who migrate from rural areas will not be able to find a job and will be obliged to do abovementioned marginal jobs. Therefore, this highlights the contribution and importance provided by homegardens in rural areas.

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