General Characteristics of Traditional Homegarden Involving Animal Practices in Rural Areas of Isparta Region of Turkey

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Abstract: This study has been prepared for the purpose of designating the general structure of traditional home-gardening in rural areas in the Isparta Region. Agroforestry Diagnosis and Design Methodology (D&D), interviews and surveys as well as literature and document analysis methods have been used in the study. It has been determined that there are 3 different traditional homegardens are present in the rural areas of the Isparta Region and that the area covered by the smallest home garden is 30 m², whereas the largest home garden has an area of 9000 m². Seventy-three different plant species of economic value have been detected in traditional homegardens. Thirty-three of these plant species are composed of fruits and forest tree species, while 40 are composed of vegetables and other agricultural plan species. Furthermore, 5 types of animals are raised for animal products such as meat, milk and eggs. The vegetables and fruits produced in traditional homegardens are primarily used for household consumption. Surplus products are sold at the markets in villages or in the centers of towns and provinces. The analyses indicate that the products are fully consumed by the households in the homegardens of 0-250 m², whereas in the homegardens covering an area of 251-1 000 m² half of them is consumed by the household and the rest is sold at the market. Market-oriented production is performed in the homegardens occupying an area >1000 m².

Key words: Traditional homegardens, silvopastoral systems, agroforestry, isparta region, vegetables, Turkey

INTRODUCTION

Although, there are many studies regarding homegardens in the world and especially in the tropic regions and the American Continent (Mohan, 2004), the number of researches conducted on traditional homegardens in Turkey is scarce. Yet, the inhabitants of rural areas have been traditionally utilizing these practices since years for the nutritional and food safety purposes.

The structure and composition of homegardens varies according to the livelihood conditions of the regions (Wiersum, 1982; Christanty *et al.*, 1986; Soemarwoto, 1987; Peyre *et al.*, 2006). Moreover, personal needs and preferences, physical environment, socioeconomic and cultural structure and ecological sustainability are the main determinants of the appearance, function and structure of homegardens (De Clerck and Negreros-Castillo, 2000; Christanty *et al.*, 1986; Mohan, 2004; Abebe, 2005; Abdoellah *et al.*, 2006).

Within this framework, traditional homegardens are defined as a small scale, supplementary food production system by and for household members that mimics the natural, multilayered ecosystem (Hoogerbrugge and Fresco, 1993). According to another definition, traditional homegardens which avail of many economic, social, cultural, aesthetic and ecological functions (Soemarwoto and Conway, 1992; Wezel and Bender, 2003; Abdoellah *et al.*, 2006) traditional homegardens are characterized by different vegetation strata composed of trees, shrubs and herbs in association with annual and perennial agricultural crops and small livestock within the house compounds (Nair, 1993; Wezel and Bender, 2003).

The diversity of plant species and plant cover strata are among the most striking characteristics of homegardens. Traditional homegardens are generally composed of 3 strata. The first stratum is composed of various tree species at a height of 3-10 m. The second stratum is composed of species at a height of 1-3 m such as trees, shrubs and bushes, whereas the third stratum is the one where herbaceous and wood-like species at a height of 0-1 m such as vegetables and medical plants are raised (Nair, 1993; Wezel and Bender, 2003). Studies conducted across the world indicate that the area of

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homegardens varies between 1-2 m² to 1-2 ha and may even reach 3 ha (Christanty *et al.*, 1986; Mitchell and Hanstad, 2004).

For instance, the size of the homegardens in Java may vary between 100-1000 m² (Soemarwoto and Conway, 1992), the majority of the homegardens is <200 m² (Mitchell and Hanstad, 2004). The average size of homegardens in Nepal is reported to be 415 m² (Pandey, 2008), whereas, the size of the homegardens in Laos Phonxay varies between 0.25-1.0 ha (Sodarak *et al.*, 2005).

In the study conducted by Oakey (2004) in the villages of Bishnapur and Baushid in Bangladesh the size of homegardens is detected to be generally smaller than 50 m². In the study conducted by Banik *et al.*, 1994 in Ban Klong Takien, Thailand, it is reported that the size of homegardens varies between 400-1600 m².

MATERIALS AND METHODS

Description of research area: According to the demographic data of 2008, the Province of Isparta, located in the north of the Mediterranean Region has a population of 407-463 people. The region has an average altitude of 1050 m and is located at 37°18' and 38°30' North latitudes and 30°20' and 31°33' East longitude (URL-1, 2008).

The average annual temperature is 12°C dir. The coldest months of the year are January and February where the average daily temperature varies between 1.8-2.6°C. In July and August, which are the warmest months, the average daily temperature varies between 23.5-22.9°C.

The average annual precipitation in the Province of Isparta is 553.1 kg m⁻¹ (Meteoroloji and Baskanligi, 2009). About 72.69% of the precipitations occurs in winter and spring months, whereas summer and spring months, when 23.31% of the total precipitations occurs are dry. The precipitations generally occur in the form of rain and snow. The annual amount of precipitation increases from the north towards the south of the province (URL-1, 2008).

Diagnosis and Design Methodology (D&D): Pursuant to the investigation and evaluation of the soil use implementations conducted traditionally since years, agroforestry has been characterized and defined as the use of different land in agricultural and forestry productions.

Therefore, it is obligatory to start with the investigation of the production techniques of traditional agroforestry in the investigations to be conducted with regard to agroforesty in any region. Thus, the

Agroforestry Diagnosis and Design Methodology (D&D) developed by the International Council for Research in Agroforestry (ICRAF) has been used in this study (Raintree, 1987). D&D, which is composed of five phases is frequently used in the definition of land use systems and the investigation of production techniques. This phase of the technique may be defined as Prediagnostic. On the other hand, the problems in any diagnosed and defined land use system may again be designated via this technique and proposals may be developed for solving the problems. In other words, the production system is tackled and planned. This phase of the technique is evaluation. Meanwhile, implementations aiming the solution of the problems in the production system are conducted in the final phase and this phase is called the development phase. The implementation phases of D&D are provided in Table 1. In the study, the Prediagnostic phase, which is the first phase of D&D has been used. Within this framework, the diagnostic phase has been used in determining the general structure of homegardens and investigating aspects such as the designation of the plant species and animal types raised.

Site selection: The Isparta Region is the region where agroforestry is widely implemented. One of the most important agroforestry implementations especially in rural areas is homegardens and homegardens involving animals.

Sample selection: Within the scope of this study, the traditional homegarden practices in the rural settlement areas of the Isparta Region have been recorded with the Registration and Questionnaire Forms of Sample Implementors.

According to Abdoellah *et al.*, 2006, the implementation frequency of the registration and questionnaire forms of sample implementors that is the sample size has been calculated upon using the following Eq. 1:

$$n = \frac{Z^2 * N * P * Q}{N * D^2 + Z^2 * P * Q} \qquad (1)$$

Where:

n = Number of samples

Z = The value of the normal variable (1.96) for a reliability level of 0.95

P = The highest possible proportion (0.5) for a reliability level of 0.95

Q = 1-P

N = Number of main group

D = The sampling error (5% has been taken)

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

D&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
Diagnostic	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
	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.
		Causal factors, constraints and intervention points	Troubleshooting the problem sub-systems
Design and evaluation	How to improve the system? (What is needed to improve system performance)	Specifications for problem solving or performance enhancing interventions	Iterative design and evaluation of alternatives
planning	What to do 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

The population living in the townships and villages in the Isparta Region in 2008 has been designated as 142-608 people (URL-2, 2009). Furthermore, the total number of households in the townships and villages in the Province of Isparta has been designated as 42-553 people as per the General Census of 2000 (URL-3, 2009). Based on these figures, the amount of registration and questionnaire forms of sample implementors to be applied according to the population living in townships and villages has been calculated as follows;

$$n = \frac{1,96^2 * 142608 * 0,5 * 0,5}{142608 * 0,05^2 + 1,96^2 * 0,5 * 0,5} = 383$$

Whereas, the number of registration and questionnaire forms of sample implementors to be applied according the total number of households in townships and villages has been calculated as follows;

$$n = \frac{1,96^2 * 42553 * 0,5 * 0,5}{42553 * 0,05^2 + 1,96^2 * 0,5 * 0,5} = 380$$

However, in land studies, The Registration and Questionnaire Forms of Sample Implementors has been applied on 443 people for the purpose of attaining more accurate results.

Questionnaire: The land observations of traditional homegardens in the rural areas of the Isparta Region have been conducted between 10.01.2009-10.05.2009.

In the land investigations, it has been aimed to reach all villages as much as possible so as to achieve homogeneity among districts. No selection has been used for villages investigated. Moreover, more questionnaires have been conducted in towns with a higher number of districts and villages. Furthermore, less questionnaires could be conducted in towns with irrigation problems.

Various quantitative and qualitative data have been reached regarding homegardens located in the investigation area through the use of questionnaires. Within this framework, information has been reached regarding the physical structure of homegardens as well as the vegetal and animal products grown through the questions in the questionnaire.

Attention has been paid to ensure that the questions raised in the questionnaire are as clear and comprehensible as possible. It has been aimed to detect the views of individuals and attain qualitative data through open-ended and multiple choice questions. It has been aimed to attain the most accurate data possible regarding various activities conducted in homegardens via the questionnaire. In order to prevent the misunderstanding of the questions in the survey and ensure that all questions are answered, the questionnaire has been conducted face to face with the locals. The questionnaire has first been implemented in the town of Aksu at a small scale and the deficiencies in the questionnaire as well as the topics which were misunderstood have been corrected.

Data analysis: The analysis of the data obtained via questionnaires has been conducted by using the statistical program SPSS 15.0 statistical program and Microsoft Office Excel.

Furthermore, the methods described above have been supported with the following research methods:

Literature analysis: The scientific studies previously conducted in relation with this topic (theses, articles, researches, projects, etc.) have been screened and scientific data related with the topic have been collected.

Document analysis: Relevant information and statistical data have been collected from public and private agencies related with the topic.

Interviews: These interviews have been conducted with the households performing traditional homegarden implementations in the rural areas of the Isparta Region.

RESULTS AND DISCUSSION

The traditional homegardens in the rural areas of the Isparta Region are composed of a garden and a house inside or adjacent to the garden. But, there also cases where the gardens are separate from the house or the gardens are scattered. In fact, as a result of land investigations it has been designated that 24.15% of homegardens in the Isparta Region is scattered.

Although it has been reported that the size of the homegardens in Bangladesh varies between 30-700 m^2, whereas the area of the homegardens on the Indonesian islands is 2500 m^2 on average and such areas may be as large as 3 ha (Christanty *et al.*, 1986; Mitchell and Hanstad, 2004), it has been detected that the areal size of the traditional homegardens in the Isparta Region varies. The detected area of the smallest homegarden is 30 m^2 whereas the area of the largest garden is 9000 m^2. The average of the homegardens in the region is 1094.18 m^2. Besides, there are also homegardens which are considerable large in the region. However, these homegardens are operated for commercial purposes and have not been included into the investigation.

The areal distribution of the traditional homegardens in the Isparta Region has been provided in Table 2. Especially the homegardens larger than 1000 m^2 with a rate of 35.21% are most frequently encountered homegardens in this region. Homegardens covering an area between 501-1000 m^2 are placed in the second position with a rate of 27.99%.

No irrigation problems are encountered in the majority of the homegardens in the Isparta Region. In total 443 homegardens have been investigated and it has been detected that there is an irrigation problems of 11.74%. In the other gardens, irrigation is performed through city water or well water.

The traditional homegardens in the Isparta Region are generally enclosed with picket fence or rarely with iron railing or stone walls. Besides, a section of the garden is reserved for housing the animals raised. There is a separate entrance for this section.

Soini (2005) has reported that ovine and bovine breeding is conducted in the homegardens in Tanzania. It

Table 2: Areal distribution of traditional homegardens in the Province of Isparta

Area groups	Frequency	Percent	Cumulative percent
0-100 m^2	43	9.71	9.71
101-250 m^2	45	10.16	19.87
251-500 m^2	75	16.93	36.80
501-1,000 m^2	124	27.99	64.79
>1,000 m^2	156	35.21	100.00
Total	443	100.00	

has been detected that animal breeding is widespread also in the homegardens in the Isparta Region and that bovine and ovine breeding is performed in 75.17% of homegardens. In the homegardens not utilized for agricultural activities, the section reserved for animal housing may cover the whole garden. For instance, in the homegardens in the Township of Aksu, animal shelters are mostly under the house. Due to the rugged terrain, the land is used at the maximum level.

In the assessment of the structure of traditional homegardens in the rural areas of the Isparta Region, it may be possible to talk about the presence of 3 types of homegardens, namely:

- Gardens where one-year products are grown such as vegetables and fruits (melons, watermelons, etc.)
- Gardens where there are fruit trees (apples, apricots, cherries, etc.) and one-year vegetable and fruit production is performed
- Gardens where there are forest trees (pine, cedar, etc.) and fruit trees (walnuts, almonds, apricots, cherries, etc.) and where one-year vegetable and fruit production is performed

The interviews conducted with the locals have shown that artificial fodder for feeding the animals. The annual artificial fodder fees paid per household in the homegardens in the Province of Isparta have been presented in Table 3. In addition to the use of artificial fodder it has also been detected that in 72.23% of homegardens, kitchen leftovers are used for feeding animals. In addition, the locals send the animals to meadows, pastures and forest lands for feeding bovine and ovine. Bovine animals are generally sent to meadows and pastures while ovine animals are mostly sent to grazing in forest lands. Especially ensuring the grazing of pure hair goats is crucial for the inhabitants of rural areas. Within this framework, important research results have been obtained for the use of the country (Tolunay *et al.*, 2005, 2009a-d; Ayhan *et al.*, 2009).

It is reported that in the homegardens in Ghana, a significant portion of the annual meat and meat product

Table 3: Annual amount of artificial fodder fees per household in the traditional homegardens in the Province of Isparta

Cost groups	Frequency	Percent	Cumulative (%)
No expenditure	145	32.73	32.73
1-250 €	45	10.16	42.89
250-500 €	78	17.60	60.49
500-1000 €	62	14.00	74.49
1000-2500 €	59	13.32	87.81
>2500 €	54	12.19	100.00
Total	443	100.00	

€: Euro

requirement of the households is fulfilled by the animals raised in their homegardens (Mitchell and Hanstad, 2004). Similarly, in the interviews conducted with the locals it has been detected that the meat, milk and eggs of the animals raised in homegardens in fulfilling the household food requirement. Furthermore, the surplus products are sold to local markets or dairy farms.

Wezel and Bender (2003) have reported that homegardens play a major role in the procurement of food and nutrients for the people living in rural areas through the high variety of plants in homegardens. In the interviews conducted with the locals in rural areas, it has been detected that household members regard homegardens as a life insurance and that even if the vegetables, fruits and animal products are sold at local markets, the production in homegardens is performed primarily for household consumption.

Therefore, the other section of homegardens is utilized for agricultural production purposes. Production in homegardens is performed mainly in spring and summer months due to rough winters in the area. Households with a greenhouse in their garden may produce also in winter. Herbaceous and wood-like plants are grown within a certain order. For instance, trees are generally planted on the sides or in a specific area of the garden.

Hence, the trees in the homegardens that cover a large area and bear a commercial production purpose are planted in a manner so as to cover the whole garden vegetables are grown among these trees. In the land observations it has been detected that in 78.56% of traditional homegardens in rural areas in the Isparta Region 33 different types fruit/forest tree species are grown.

In homegardens whose primary objective is to fulfill household consumption, an area is reserved for growing vegetables. In this area, different types of vegetables are grown within a certain sequence and order without being mixed with each other. In agricultural productions animal and chemical manure is mostly used together. The types of manure used in the traditional homegardens in the Province of Isparta and their proportional distribution have been presented in Table 4.

Table 4: The types of manure used in the traditional homegardens in the province of Isparta

Type of manure	Frequency	Percent	Cumulative (%)
Animal	70	15.80	15.80
Chemical	53	11.96	27.76
Animal and chemical	282	63.66	91.42
None	38	8.58	100.00
Total	443	100.00	

Table 5: Annual payments made for buying seeds and saplings in traditional homegardens in the Province of Isparta

Cost groups	Frequency	Percent	Cumulative (%)
1-250 €	297	67.04	67.04
250-500 €	6	1.36	68.40
>500 €	5	1.13	69.53
No expenditure	135	30.47	100.00
Total	443	100.00	

€: Euro

Chemical manure is mostly used for fruit trees, whereas animal manure is generally preferred for agricultural products grown to be consumed by households. Hence, the products grown are natural and hormone-free.

In recent years people started to place importance to the consumption of hormone-free products. The products grown with natural manure in traditional homegardens in rural areas hold an important place especially in the protection of human health. Furthermore, these products which have a surplus and are sold at local markets are preferred also by people living in cities. Thus, the whole population benefits from these products grown in traditional homegardens. These products which are regarded as ecological products may find buyers at higher prices.

Locals purchase seeds and saplings for the purpose of performing agricultural activities in homegardens. In association with fruit growing activities in the area mostly apple and cherry saplings are bought for being planted in homegardens. The annual payments made for buying seeds and saplings in traditional homegardens in the Province of Isparta have been provided in Table 5.

Products which are grown in traditional homegardens and are surplus products may be sold at village markets or the markets in provincial and town markets. It is observed that currently the vegetables and fruits sold at the markets established in the Provincial center and towns of Isparta are deriving from two sources. Firstly, the products coming from agricultural areas operated for commercial purposes and agricultural establishments where there are greenhouses. Secondly, the products obtained from the homegardens of the households located in rural areas. Although there are some basic differences between agricultural establishments and homegardens, these differences have been provided in Table 6.

Table 6: Basic differences between agricultural establishments and homegardens

Agricultural enterprises	Homegardens
The area where production is made is large.	The area where production is made is small.
The main objective is to earn money and obtain commercial gain.	The main objective is to ensure the nutrition and food safety of the household. However, surplus production is taken to markets.
There is a major use of agricultural drugs and manure.	Generally animal manure is preferred. There is low use of chemical manure.
Mechanization is implemented. Agricultural tools and equipment are used.	Workforce is used for working the soild and conducting other activities.
Paid workforce is used.	Households use their own workfoce.

The products deriving from agricultural establishments and those deriving from traditional homegardens carry different characteristics. Also the inputs where production processes are used are different. Most important aspect is the qualification of the persons marketing these products.

For instance, the persons marketing the vegetables and fruits produced in agricultural establishments are professional whereas the persons marketing the products produced in the homegardens of rural areas are mostly household members.

The information relating to the marketing of products produced in the traditional homegardens of the Province of Isparta have been provided in Table 7. As it may be observed in Table 7, among those who sell the products they produce in the market, 37.92% sell the products themselves, 6.09% sell themselves and through a middleman. Those who sell via a middleman are mostly persons, who perform food production in their gardens.

The difference of the qualifications of the products produced in homegardens and sold according to the area of the homegarden has been provided in Table 8. When we assess the differences in seller qualifications of the products produced in homegardens and sold in local markets and dairy farms depending on the areas of homegardens, we may observe that products produced in homegardens with an area of up to 250 m² are placed on sale but they are mostly used in household consumption. There is a balance between the products sold and the products consumed by the household for homegardens at an area of 251-1 000 m². Finally, only 12.18% of the products produced in the homegardens with an area of 1001 m² and above are not being sold, whereas the other products are placed on sale in various markets upon being given to the middlemen.

Thus, it has been determined that in homegardens covering an area between 0-250 m² household consumption is at the forefront; in homegardens covering an area between 251-1000 m² there is a balance between household consumption and the production surplus products sold at the market; whereas in homegardens covering an area larger than 1000 m² the products sold at the market are at the forefront.

Table 7: Marketing of products produced in the traditional homegardens in the Province of Isparta

Seller groups	Frequency	Percent	Cumulative percent
Myself	168	37.92	37.92
Middleman	87	19.64	57.56
Myself and middleman	27	6.09	63.65
No selling	161	36.34	100.00
Total	443	100.00	

Although the sale of animals and animal products raised in the homegardens in the area group of 0-100 m² constitutes a major source of income, there is an increase in the quantity of the products sold and the products not sold associated with the increase in the area of homegardens varying between 101-1000 m² in Table 8. However, there is a decrease in the quantity of products not sold in the homegardens with an area >1000 m². It may hence be stated that there is a purpose of commercial production in the homegardens >1000 m².

In the research conducted in the Isparta Region it has been detected that homegardens are passed from generation to generation and used for production since years. The period of the use of traditional homegardens in the Isparta Region has been provided in Table 9. Mohan (2004) has reported that agricultural activities are conducted for an average period of 52.7 years in the homegardens investigated in Kerala whereas the longest period of utilization of the homegardens in the Isparta Region is 71 years.

Agricultural and animal production in homegardens is mostly conducted by household members. These activities are mainly conducted by women and men together. Furthermore, Mitchell and Hanstad (2004) state that women have a say in topics such as which products will be mostly grown in homegardens, when they will be harvested, how homegarden resources will be used the sale of products and fulfillment of daily needs. In the interviews conducted with the locals it was detected that there is similar situation also for the area invstigated.

Howard (2003) reported that women obtain an income by selling the products of homegardens. The same has been detected also for the Isparta Region.

Table 8: Differences based on the area of homegardens, in the qualifications of sellers of products sold upon being produced in homegardens

	Who sells								
							Myself and		
Area of homegarden	Myself	(%)	Middleman	(%)	No selling	(%)	Middleman	(%)	Total
0-100 m²	9	20.93	7	16.28	27	62.79	0	0.00	43
101-250 m²	7	15.56	6	13.33	32	71.11	0	0.00	45
251-500 m²	28	37.33	9	12.00	36	48.00	2	2.67	75
501-1 000 m²	43	34.68	32	25.81	47	37.90	2	1.61	124
>1000 m²	81	51.92	33	21.15	19	12.18	23	14.74	156
Total	168		87		161		27		443

Moreover, paid workers are also hired in homegardens. Data on hired labor in traditional homegardens in the Isparta Region has been provided in Table 10. It may be deduced from Table 10 that labor is hired in 14.22% of homegardens.

The working period in the traditional homegardens in the rural areas of the Isparta Region varies mainly between 1-6 h depending on the production activity. The average working period in homegardens is 3.5 h. As it may be understood from Table 11, the working period especially of 4-6 h has the highest share with 58.01%. Again, the working period of 1-3 h has a share of 36.11%.

The vegetables and fruits among the products produced in traditional homegardens in the Isparta Region, which are used for household consumption are consumed in conserved and dried form. Information regarding the status of conserved and dried vegetables produced in traditional homegardens in the Isparta Region has been provided in Table 12.

Abdoellah *et al.* (2006) reported that the objective distribution within the society of the products produced in traditional homegardens constitutes a social dimension of homegardens. It has been determined that a portion of the products produced in homegardens in the Region of Isparta are given to neighbors and relatives.

The site surveys and interviews conducted in the research area have shown that 73 different plant species with economic value are grown in traditional homegardens that 33 of these plant species are fruit and forest trees whereas 40 are vegetables and other agricultural plants that 5 different animal types are raised for animal production such as meat, milk and eggs. It is estimated that this number will increase upon adding the subtypes and varieties of these plant species.

The vegetables and fruits produced are mainly used in household consumption. Moreover, in addition to plant types subjected to commercial production especiialy fruit types hold a major share in the income obtained in homegardens.

Apples (*Malus domestica* Borkh.), cherries (*Prunus avium* L.), apricots *(Prunus armeniaca* L.), peaches (*Prunus persica* L.), sour cherries (*Prunus cerasus* L.) and grapes (*Vitis vinifera* subsp. *sativa* L.) are the main fruit

Table 9: Period of utilization of the traditional homegardens in the Province of Isparta

Usage years of homegardens	Frequency	Percent	Cumulative (%)
0-5 years	30	6.77	6.77
6-10 years	46	10.38	17.15
11-20 years	134	30.25	47.40
21-40 years	196	44.25	91.65
>40 years	37	8.35	100.00
Total	443	100.00	

Table 10: Workforce hiring status in traditional homegardens in the Isparta Region

Labor groups	Frequency	Percent	Cumulative (%)
Hired Labor	55	12.41	12.41
Household Labor	372	83.97	96.38
Hired and household labor	8	1.81	98.19
None	8	1.81	100.00
Total	443	100.00	

Table 11: Daily working period in homegardens in the Province of Isparta

Daily input of labor	Frequency	Percent	Cumulative (%)
0 h	8	1.81	1.81
1-3 h	160	36.11	37.92
4-6 h	257	58.01	95.93
7-9 h	15	3.39	99.32
>9 h	3	0.68	100.00
Total	443	100.00	

Table 12: Status of conserved and dried vegetables produced in traditional homegardens in the Isparta Region

Amount	Frequency	Percent	Cumulative (%)
0 kg or bottle	67	15.12	15.12
1-25 kg or bottles	157	35.44	50.56
26-50 kg or bottles	173	39.06	89.62
51-75 kg or bottles	23	5.19	94.81
76-100 kg or bottles	16	3.61	98.42
>100 kg or bottles	7	1.58	100.00
Total	443	100.00	

types. Furthermore, in the homegardens in Egirdir, Keciborlu, Gonen and Central Townships, roses (*Rosa* L. sp.) are grown where as in the homegardens of the Towns of Keciborlu, Uluborlu and Senirkent lavenders (*Lavandula* L. sp.) are produced. Again, in the Central Town of Kuleonu and the villages of Egirdir Tepeli and Keciborlu Ozbahçe, Persimmons (*Diospyros kaki* L.) are grown.

Table 13: Plant species found in the traditional homegardens in the Isparta Region and their purpose of utilization (adapted from Turna and Acar, 2001)

Plant species	Food	Fodder	Fuel wood	Round wood	Apiculture	Ornamental and perfumery	Soil conservation	Medicinal	Live fences	Shade	Windbreak/ shelterbelt
Tomato (*Lycopersicum esculentum* Mill.)	X	x									
Pepper (*Capsicum annuum* L.)	X										
Eggplant (*Solanum melongena* L.)	X	x									
Cabbage (*Brassica oleracea* L. var. *capitata* (L.) Alef.)	X	x									
Leek (*Allium ampeloprasum* L. var. *porrum* (L.) J. Gay.)	X										
Romaine Lettuce (*Lactuva sativa* L. var. *longifolia*)	X	x									
Parsley (*Petroselinum hortense* Hoffm.)	X										
Garden Rocket (*Eruca vesicaria* subsp. *sativa* Mill.)	X										
Dill (*Anethum graveolens* L.)	X										
Garden Cress (*Lepidium sativum* L.)	x										
Cauliflower (*Brassica oleraceae* L. convar. *botrytis* (L) Alef. var. *botrytis*)	x										
Spinach (*Spinacia oleracea* L.)	x	x									
Purslane (*Portulaca oleracea* L.)	x										
Cucumber (*Cucumis sativus* L.)	x	x									
Mint (*Mentha* L. spp.)	x										
Radish (*Raphanus sativus* L.)	x										
Peanut (*Arachis hypogaea* L.)	x										
Zucchini (*Cucurbita* L. spp.)	x	x									
Onion (*Allium cepa* L.)	x										
Garlic (*Allium sativum* L.)	x										
Celery (*Apium graveolens* L.)	x										
Bean (*Phaseolus vulgaris* L.)	x	x									
Chickpea (*Cicer arietinum* L.)	x										
Broad Bean (*Vicia faba* L.)	x										
Maize (*Zea mays* L.)	x	x									
Potato (*Solanum tuberosum* L.)	x	x									
Okra (*Abelmoschus esculentus* L.)	x										
Carrot (*Daucus carota* L.)	x										
Watermelon (*Citrillus lanatus* (Thumb.) Matsum et Nakai)	x	x									
Melon (*Cucumis melo* L.)	x	x									
Grape (*Vitis vinifera* subsp. *sativa* L.)	x									x	
Chard (*Beta vulgaris* L. var. *cicla*)	x										
Beetroot (*Beta vulgaris* L. var. *condivita* Alef.)	x										
Rose (*Rosa* L. spp.)	x					x			x		
Cedar (*Cedrus libani* A.Rich.)			x	x	x		x			x	x
White Poplar (*Populus alba* L.)		x	x	x			x			x	x
Black Poplar (*Populus nigra* L. subsp. *nigra*)		x	x	x			x				x
Kermes Oak (*Quercus coccifera* L.)		x	x	x			x				
Turkey Oak (*Quercus cerris* L.)		x	x	x			x			x	
Common Juniper (*Juniperus communis* L. subsp. *communis*)		x	x	x	x		x		x		
Apple (*Malus domestica* Borkh.)	x						x				
Cherry (*Prunus avium* L.)	x						x			x	
Sour Cherry (*Prunus cerasus* L.)	x						x		x	x	
Walnut (*Juglans regia* L.)	x		x	x			x			x	
Plum (*Prunus domestica* L.)	x						x			x	
Almond (*Prunus dulcis* (Mill.) D.A.Webb)	x						x			x	
Pear (*Pyrus communis* L.)	x						x			x	
Peach (*Prunus persica* L.)	x						x			x	
Quince (*Cydonia oblonga* Miller)	x						x		x	x	
Apricot (*Prunus armeniaca* L.)	x						x			x	
Olive (*Olea europaea* L. var. *europaea*)	x						x	x		x	
White Mulberry (*Morus alba* L.)	x										
Black Mulberry (*Morus nigra* L.)	x										
Greek Juniper (*Juniperus excelsa* Bieb.)		x	x	x	x		x			x	
Opium Poppy (*Papaver somniferum* L.)	x										
Barley (*Hordeum vulgare* L.)	x	x									
Common Wheat (*Triticum aestivum* L.)	x	x									

Table 13: Continued

| | | | | | | | Ornamental | | | | | |
Plant species	Food	Fodder	Fuel wood	Round wood	Apiculture	and perfumery	Soil conservation	Medicinal	Live fences	Shade	Windbreak/ shelterbelt
Turkish Hazel (*Corylus colurna* L.)	x		x				x			x	
Persimmon (*Diospyros kaki* L.)	x						x			x	
White Willow (*Salix alba* L.)		X	x				x			x	
Black Willow (*Salix nigra* Marshall)		X	x				x			x	
Babylon Willow (*Salix babylonica* L.)		X	x				x			x	
Anatolian Black Pine (*Pinus nigra* Arn. subsp. *nigra* var. *pallasiana* Lamb (Holmboe))			x	x	x		x			x	x
Turkish Pine (Calabrian Pine) (*Pinus brutia* Ten.)			x	x	x		x			x	x
Umbrella Pine (*Pinus pinea* L.)	x		x	x	x		x			x	x
Scots Pine (*Pinus sylvestris* L.)			x	x	x		x			x	x
Thuja (*Thuja* L. spp.)		x			x				x		
Lavender (*Lavandula* L. spp.)						x		x	x		
Silver Lime (*Tilia tomentosa* Moench)	x	x	x			x	x	x		x	
Dog Rose (*Rosa canina* L.)	x	x						x	x		
Cornelian Cherry (*Cornus mas* L.)	x	x						x	x		
Black Locust (*Robinia pseudoacacia* L.)		x	x		x	x	x			x	
Pomegranate (*Punica granatum* L.)	x		x				x				

The plant species found in the traditional homegardens in the rural areas of the Reigon of Isparta and their purpose of utilization has been provided in Table 13.

The types of animals raised in traditional homegardens for the production of milk, meat and eggs are cattle (*Bos taurus* L.), pure hair goats (*Capra hircus* L.), domestic sheep (*Ovis aries* L.), chicken (*Gallus gallus* L.) and turkeys (*Meleagris gallopavo* L.).

CONCLUSION

We have currently reached an important phase in the researches conducted in agroforestry in Turkey. For instance, the agroforestry potential of our country has been detected and the agroforestry production systems have been classified (Tolunay *et al.*, 2007).

Currently, the topics to be examined in the field of agroforestry have concentrated on the investigation and analysis of production techniques. Within this framework, the silvopastoral systems of agroforestry have been one of the most investigated topics and major research results have been provided so as to be used by our country (Tolunay *et al.*, 2005; Ayhan *et al.*, 2009; Tolunay *et al.*, 2009a-d).

Also the production techniques included into the agrisilvicultural systems of agroforestry should be taken up and evaluated separately. The traditional homegardens included into agrisilvicultural systems and availing of many economic, social, cultural, aesthetic and ecological functions (Soemarwoto and Conway, 1992; Wezel and Bender, 2003; Abdoellah *et al.*, 2006), may be characterized as different vegetation strata composed of trees, shrubs and herbs in association with annual and perennial agricultural crops and small livestock within the house compounds (Nair, 1993; Wezel and Bender, 2003).

This study has been prepared for the purpose of presenting the general structure of traditional homegardens in the rural areas of the Isparta Region which has not received sufficient attention so far from authorized organizations and agencies and academic circles and which holds an important position in providing food and income security of the people living in rural areas.

It is known that the society survives by intra-familial solidarity especially during economic crises in our country. During such crises, people in rural areas base themselves on traditional homegardens. Even if the people living in rural areas do not have a regular job and income, they are able to make production that may ensure food safety in homegardens.

We believe that the analysis of the regional distribution of traditional homegardens in Turkey will reveal regional differences among them. This may be in the form of differences in the operation and management of traditional homegardens and the physical structure of hoemgardens and the products grown therein. For instance, the plant species and composition in the rural homegardens in the Eastern Black Sea Region, investigated by Turna and Acar (2001), differ from those in the Isparta Region. Hence, similar versions of this study should be conducted upon taking into account different regions of Turkey. Thus, the similarities and differences between regions may be revealed.

It has been detected in the land surveys and interviews conducted in the area of research that 73 different plant species with economic value are grown in

traditional homegardens that 33 of these plant species are fruit and forest trees, 40 are vegetables and other agricultural plants, whereas 5 different animal types are raised for animal production such as meat, milk eggs.

The agricultural products produced in traditional homegardens are used primarily for household consumption. However, surplus products may be sold to local markets and dairy farms. About 36.34% of the products produced in traditional homegardens are used only for household consumption. Furthermore, the products produced in all area groups may be placed on sale at variable rates.

Yet, the productions conducted in homegardens, with an area varying between 0-250 m^2, are performed mostly for covering household consumption. Homegardens with an area carrying between 250-1 000 m^2, are at the phase of making transition to commercial production. In other words, in addition to fulfilling household needs it is also possible to talk about the presence of a commercial production purpose whereas, in homegardens with an area larger than 1000 m^2, commercial production is at the forefront.

Especially the agricultural products grown for household consumption are being grown as animal manure and the products raised within this scope are evaluated as ecological products. In recent years, demand for ecological products has increased especially from the people located in urban areas and these products began to find buyers at market prices. From this perspective, the demand and consumers of products produced without using chemical fertilizers in traditional homegardens will increase in future. Within this scope, nowadays, when the use of ecological agricultural products is at the forefront, marketing mechanisms should be developed for ensuring that the products produced in rural homegardens are reached by the consumer mass demanding them.

Furthermore, attention should be paid to homegardens which carry a vital importance for the people in rural areas by Provincial and Township Directorates and especially the General Directorate of Forest Affairs which plays an important role in ensuring the development of forest villages and sample implementation should be performed with projects to be developed in this direction.

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