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A Study on Surrounding Elements in Housing Gardens: Case Study of Isparta City

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Abstract

The aim of this study was evaluating surrounding elements of selected housing gardens located in 33 neighborhoods of Isparta city center. The total of 278 face-to-face survey technique was applied on household and their responds were noted. It has realized that majority of garden walls had not appropriate design and landscape practice techniques applied. Because the light intensity and shady properties are important influence on garden planting, 164 of responders reported that their garden has a shady property. Moreover, six type of wall element (stone, concrete, briquette, wood, metal, plant) were observed but these walls are mostly constructed with concrete (72), followed by stone (17), metal (8), briquette (7), wood (2) and plant (1), respectively. In addition, 43 walls were found to be made combination of these six basic structural elements. But some surrounding elements were made from mortarless stone and bare concrete that are not particularly attractive. Some pictures from front-, back- and side garden's surrounding structures (walls, fences, boundary elements) of family house gardens presented for evaluating. It was found that many of garden walls had no aesthetic and functional properties and mostly neglected appearance. In this sense, some suggestions have been made under landscape architecture discipline.

Keywords: Detached family house, surrounding elements, garden walls, landscape architecture.

Konut Bahçelerinde Çevreleme Elemanları Üzerine Bir Çalışma: Isparta Örneği

Öz

Bu çalışmanın amacı, Isparta il merkezindeki 33 mahallede bulunan müstakil ev bahçelerindeki çevreleme elemanlarını araştırmak ve değerlendirmektir. Bu amaca uygun olarak, toplam 278 hane halkına daha önceden hazırlanmış yüz yüze anket tekniği uygulanmış ve verilen cevaplar not edilmiştir. Çalışma sonucunda, bahçe duvarlarının çoğunun peyzaj tasarım ilkeleri dikkate alınmadan inşa edildiği anlaşılmıştır. Bahçelerdeki ışık yoğunluğu ve gölge özellikleri, bitkisel materyalin gelişimi üzerinde önemli etkilere sahip olduğundan, ankete katılan 164 ev sahibi, bahçelerinin gölgeli bir özelliğe sahip olduğunu bildirmiştir. Ayrıca altı tip duvar elemanı (taş, beton, briket, ahşap, metal, bitki) gözlenmiştir ve bu duvarların çoğunlukla beton (72), taş (17), metal (8), briket (7), ahşap (2) ve bitkiden (1) yapıldığı anlaşılmıştır. Ayrıca, bu altı temel yapısal elemanın birbiriyle çeşitli kombinasyonuyla inşa edilmiş 43 duvarın bulunduğu anlaşılmıştır. Ancak bazı çevreleme elemanlarının estetik olmayan, harçsız taş ve çıplak betondan yapıldığı gözlemlenmiştir. Ön, arka ve yan bahçelere ait çevreleme elemanlarından (duvarlar, çitler, sınır elemanları), bazı müstakil konut bahçelerinin değerlendirilmesi için çeşitli fotoğraflar çekilmiştir. Bu çalışma sonucunda, Isparta kent merkezindeki birçok çevreleme elemanının, estetik ve fonksiyonel özelliklere sahip olmadığı ve çoğunlukla ihmal edildiği görülmüştür. Bu bağlamda, peyzaj mimarlığı disiplini açısından bazı önerilerde bulunulmuştur.

Anahtar Kelimeler: Müstakil aile evi, çevreleme elemanı, bahçe duvarları, peyzaj mimarlığı.

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1. Introduction

Housing is very important issue since human beings. It has been primarily used for accommodation, security and privacy needs. However, house is an organized space where people have emotional relationships with the living environment in terms of their psychosocial characteristics (Ozaki, 2002; Şahin, 2008).

A well-planned residential place and its surroundings are one of the indicators of quality of life and increase user satisfactions. However, the concept of housing has changed over time. People have become to search a more comfortable, safe and privacy to get benefits from new forms of housing (Ær∅, 2006; Dannenberg et al., 2003). As a result of uncontrolled residential urban development, it has negatively affected the environment and gradually decreasing impact on green areas in cities. Therefore, the residential gardens have gained importance to eliminate people's longing for green, to increase their relations with nature and to add aesthetic value to the houses. In this regard, the house gardens are considered as one of the units of urban open green spaces, with aesthetic and functional aspects (Burgess, et al., 1988; Özer et al., 2010; Seckin, 2018; Tilson, 2003).

However, the residential structures could be divided to two different properties: inside that only the person who is invited inside knows what it looks like and outside that everyone knows how it looks like, it is open to public. Hence, the design of the residence units and its near surroundings should enable the expression and reflection of the special needs, wishes, expectations, privacy and identities of the users (Lawton, 2001; Laleci and Ozden, 2017; Özersoy, 2019).

The wall of home gardens usually looks like simply but in fact, they're engineered systems that function against the lateral pressure of soils. However, these structures could also act as at the edge of a terrace (border) and create privacy for households. When designing house and its surrounding units, the physical, geographical and social dimensions of the environment should be considered (Özer et al., 2010; Seckin, 2018).

In general design practices, the ground floors of houses are generally open to the garden and closed to the street. This case of closure arising from privacy requires the garden to be closed to the external environment (i.e. street). This is simply achieved by walls or fences surrounding the residential house units (Kuş Şahin and Erol, 2009).

Although, the concept of privacy, as a changing phenomenon in modern cultures, it primarily depends on socio-cultural nature of environment (i.e. age, gender, personal interactions, etc.). However, the privacy must be important consideration in proper design and shaping the housing units (Zorlu and Keskin, 2017). Besides, the residential house surrounding elements, walls are usually designed to ensure privacy and also for a safety requirement such as; stability against overturning, sliding, excessive foundation pressure and water uplift, so on. The detached house gardens and their surrounding elements could be provided many benefits as shielding them from the atmospheric conditions (sun, wind, rain, snow) and providing opportunities for improving aesthetic appearances. In general, a wall or fence of home garden could perform the following properties (Özer et al., 2010):

- Defining the edges of the spaces,
- Dividing and guiding the landscapes,
- Providing privacy and security,
- Mitigating or changing the wind and sunlight effect,
- Guiding the movement.

In this study, a comparative study of family detached house gardens in terms of geographical conditions and surrounding elements (i.e. fences, walls) were investigated under landscape architecture discipline. Besides, it has also be provided some suggestions and recommendations for improving aesthetic and functional qualities of these structures which effect is clearly visible on the image of the Isparta city.

2. Materials and Methods

2.1. Material

The material of this study was detached single-family house gardens in Isparta city center. Isparta province is located in the transition area between the Mediterranean region's hot and dry summers to dry climate of central Anatolia. Because the Taurus mountains in the Mediterranean region are parallel to the sea, humid and hot air cannot reach Isparta city center. Hence, the temperature differences between summer-winter and day-night are

neither as little as the Mediterranean region nor as much as Central Anatolia. Moreover, the high altitude from sea level (1050 m) have a great impact and annual snowfall is high compared to neighboring provinces. The average annual temperature and rainfall are 12.0 °C and 508.3 mm, respectively (URL-1). Generally, the snow that does not disappear for a long time in city center. Figure 1 show the average temperature and rainfall properties of Isparta.

The general information on residential conditions were supplied from the municipality of Isparta (URL-2). The total 43 neighborhoods in Isparta city center and they are covered approximately 45.000 hectares while housing zones are covered about 642 hectares. It was proposed that about 1/3 of the total number of houses (approx. 15.000 houses) were high-rise apartments and blocks called collective housing (Gül and Küçük, 2001; Şahin, 2008).

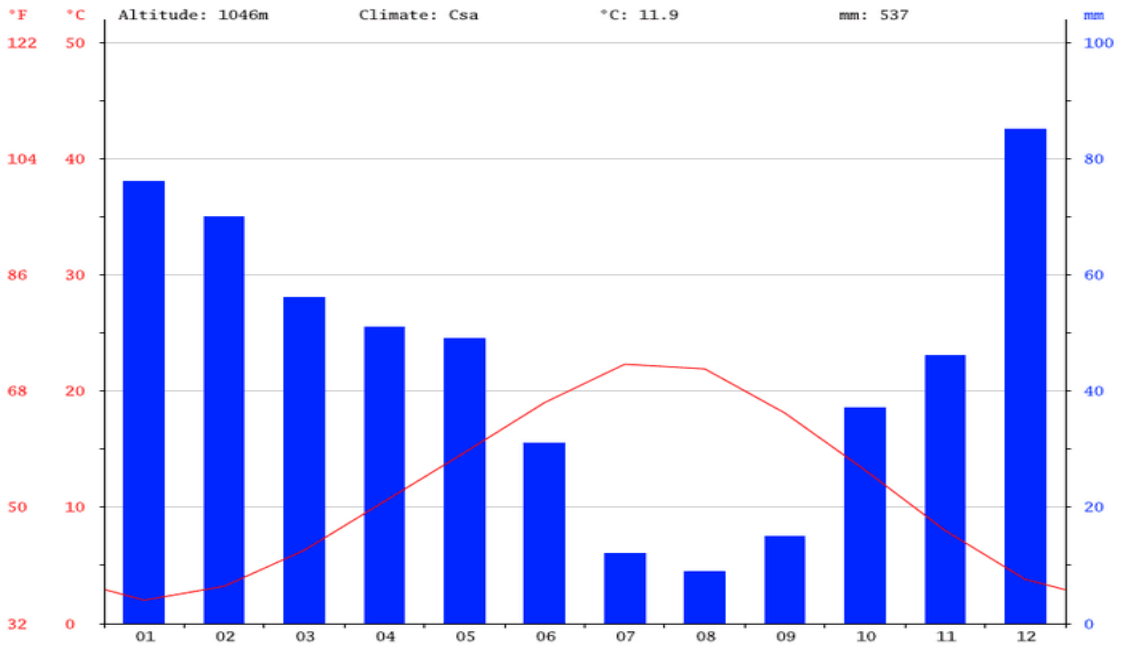

Figure 1. Annual rainfall and temperature changes for Isparta city (URL-1)

2.2. Methods

A number of stages have followed to examine. However, observation of homes' integrated structures and interviews with households were the primary source of data for this research. It has already suggested numerous researchers that face-to-face survey method has very effective to gather reliable data of many target audiences (Duffy and et al., 2005; Pinsonneault et al., 1993; Şahin, 2008; Smith et al., 2005). A standard questionnaire prepared in advance and it was implemented in selected detached houses (20 to 500 m^2 size) in 33 neighborhoods in Isparta city center. Hence, total of 278 face-to face questionnaire survey were applied to households (only one questionnaire in each sampling home) with a standard procedure and their responds were noted. In this sense, an analysis of detached single-family houses garden's geographical conditions such as; land slope properties, shade/sunny status, surrounding elements (walls, fences or boundary elements) were examined in detail in view of Landscape Architecture major. At the end of the survey questions, these gardens have carefully checked and some important issues photographed if owner of home is permitted.

3. Result and Discussions

A total number of 278 detached single-family house were visited that have at least measurable garden (20 to 500 m^2 size) in Isparta city center. These homes are classified according to their storeys. It has been classified as 119 single-storey, 124 two-storey and 35 three storey houses. Ecological values and sustainable socio-cultural factors have been reported to be effective for designed home gardens (Buttimer, 1980; Dannenberg, et al., 2003). It has well known that to build a single or multi-storey house greatly affects way of individuals daily life. In limited size of lands, depends on economic feasibility, rather than one-storey homes has usually preferred for privacy and

some particular advantages like bigger rooms and well-designed layout. But in this study, it was observed that the home gardens usually used by the families for vegetable garden, resting and cooking purposes.

Figure 2 shows road level properties (above or below) of detached single-family house gardens**.** However, the 72 of 278 responders (approx. 25%) declared that their gardens are located above or below the road level (± 2.0 m) while 206 are declared that there are flat in their location. Moreover, it has realized that the majority of gardens (61 of 72) has below the road level while only 11 gardens (11 of 72) was reported to be above road level. The sloping gardens present several challenges and has the potential to cause damage to garden. In addition, its maintenance might also be difficult and establishing plants though very important for slope stability. When rains, the water that flows down a slope slowly removes soil and could cause making plant establishment difficult and weakening existing plants with removing valuable topsoil over time. Therefore, the control of sloping or erosion, it often requires implementing costly and laborious solutions.

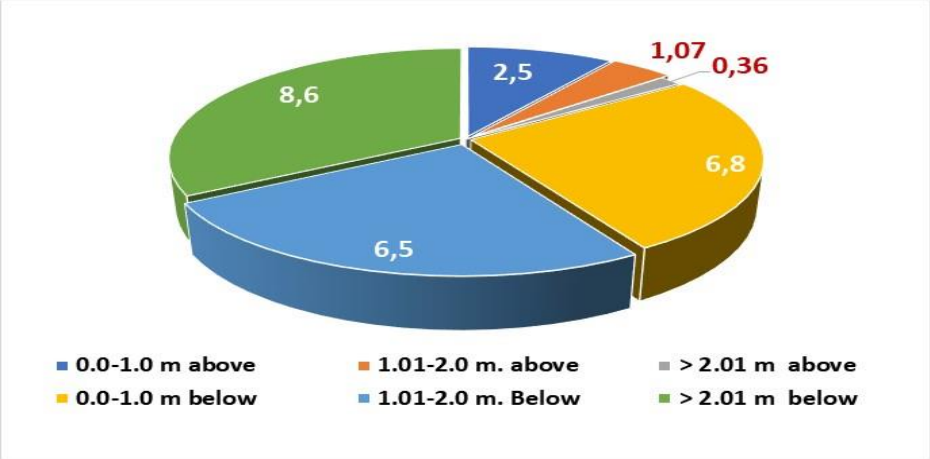

Figure 2. Road level properties (%) of gardens

Figure 3 show the participants respond the survey question of *'How could you define shady/sunny properties of your garden?'.* 164 of 278 responder reported to be have their garden has a shady status while 124 of responder reported to has no idea on that properties in their garden. However, 88 of 164 responders respond that their garden in sunny, 43 of 164 respond to be partially sunny or shady, and 33 of 164 reported to be well shady, respectively.

Understanding of the light in gardens are critical to the success of planting and appearance. It is well established that the intensity of sunlight varies based on time of day, with morning light offering softer, gentler rays and afternoon sun blazing with sizzling rays. However, the walls also cast shadows. It is a general design rule that a deep shade could be find on the north side alongside a wall, fence or beneath a tree. On the other hand, one of the most effective shading arrangements for reducing maximum air temperatures and hastening early evening cooling is by shading a west-facing wall (Seckin, 2018). It is important to note that although light and shadow level in garden is important impact on planting, it has realized that there has not much attention on that context by responders.

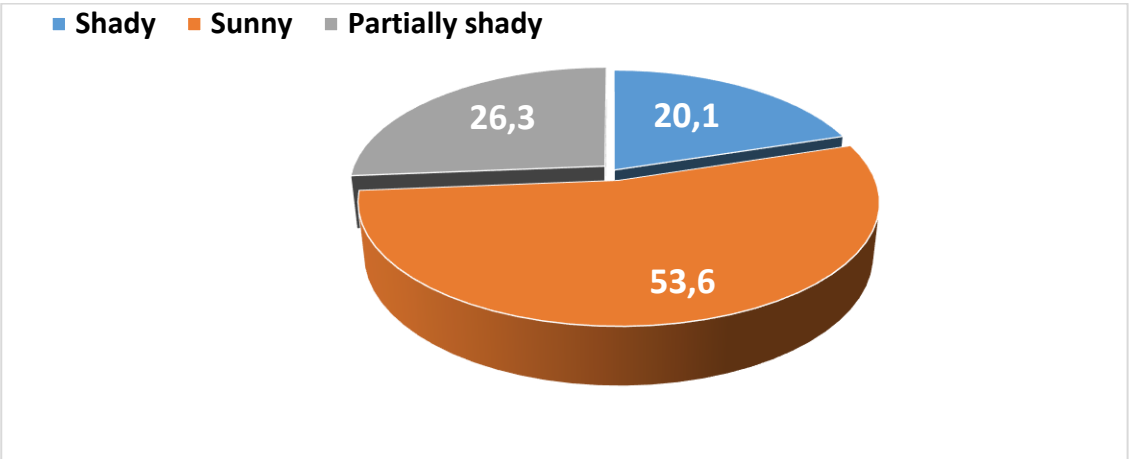

Figure 3. Shady/sunny distributions (%) of detached family house gardens

There were various type trees and water supply were observed almost in all gardens, therefore it was found out that there has sufficient amount of vegetable, fruits and herbs growing in these gardens. However, as mentioned in introduction section that garden walls have many functions to individuals, it is also very important structures for preservation lands. The lateral earth pressure that typically occur behind the slope lands which depends on the angle of internal friction and the cohesive strength of the retained (wall) materials.

Although garden surrounding elements looks like simple structures, these are play an important role in shaping the physical, psychological and climatic environment in the houses. However, these structures depend on their mass (stone, concrete or other heavy material) to resist pressure from behind and may have a *'batter'* setback to improve stability by leaning back toward the retained soil.

In this study, various types garden surrounding elements (walls or fences) has found. Table 1 show the noticed surrounding elements alone and combination with other elements. It was observed that 152 of 278 (55%) home gardens has a garden wall that constructed within six basic elements. In this context, the 72 of are constructed with concrete, 17 of were stone, eight of are metal, two of are wooden, seven of are briquette and only one was plant materials. However, these construction elements have also used with various combination to establish a various shape and dimension as responders' preferences. Hence, 30 of are combined with metal and concrete, eight of are concrete and plant, three of are with concrete and wood, two of are stone and metal; stone and plant, respectively.

However, it is important to note that the proper drainage behind the wall should be made in order to limit the pressure to the wall's design value. Because when soil behind the wall gets saturated, causing hydrostatic water pressure and weight to topple the wall. In our observation, most garden had poor drainage, and many were not built to handle the hillside. Hence, poor drainage resulting in saturated soil and frost heaving is the cause of failure of wall over time. It has also realized that some garden walls were often made from mortarless stone, briquettes or bare concrete that were not particularly attractive. It is surprising considering walls are important elements for privacy and ownership of designed area. But most of these gardens and their integrated parts (wall, fences, etc.) are usually neglected by home owners.

Table 1. The type of surrounding elements and their combinations

Surrounding element	Plain	Metal (Iron/wire)	Wood	Plant	Total
Concrete	72	30	2	8	112
Stone	17	2	-	2	21
Metal (Iron/wire)	8	-	-	-	8
Wood	2	-	-	-	2
Briquette	7			1	8
Plant	1	-	-	-	1
Total	107	32	2	11	**152**

It has found that different demand and expectations from garden users. It could be expecting because this is one of most common case from home gardens. Observation and interviews for home owner showed large differences particular, unemployed user (mostly house wives) have usually preferred more planting and green spaces and less structural elements while employed user have preferred to more open spaces and structural elements for resting.

Figures 4 and 5 show some pictures from front-, back- and side garden's surrounding elements of detached family house gardens presented. In Figure 4, it can be seen that many of surrounding elements had no function established rather than negative appearance. It can be clearly seen that there has no proper boundary functions around gardens (Figure 4 A, B, J, N) and unplastering/unveneered basic constructed elements (Figure 4 A-G, J-K). Hence, these garden's boundaries/walls have no proper function established rather than image pollution. However, it is a general design criterion for surrounding elements that these elements could be simply constructed but they should be special system to function against soil movements, act as at the edge of a terrace (border) and create privacy for households. Moreover, some surrounding element designs looks like to better organized and meet many of expectations from these structures (Figure 4 M, D, P-S). In addition, it has realized that incompatible colors were used in some doors and surrounding elements of some gardens.

It has already well predicted by Özer and his friends (2010) that if the garden surrounding elements constructed primarily for privacy which it should be built higher than eye level of at least 180 cm. However, the lower height surrounding elements (i.e. 20-60 cm) have been usually built to making the borders clear while the higher walls (i.e. 80-120 cm) should be constructed to prevent the passage of people and animals to gardens and a height of 180-250 cm to provide privacy.

It could be seen in Figure 4 that most of the garden's walls built at medium height of 50-150 cm (Figure 4 A, D-F,H,I,J,K,P) while some of built in over height (< 3.0 m) (Figure 4 B,C,G) which impact on shady properties of gardens. It could be clear evidence that house owner has not much attention on wall dimensions or heights rather than mostly very basic and simple structures established.

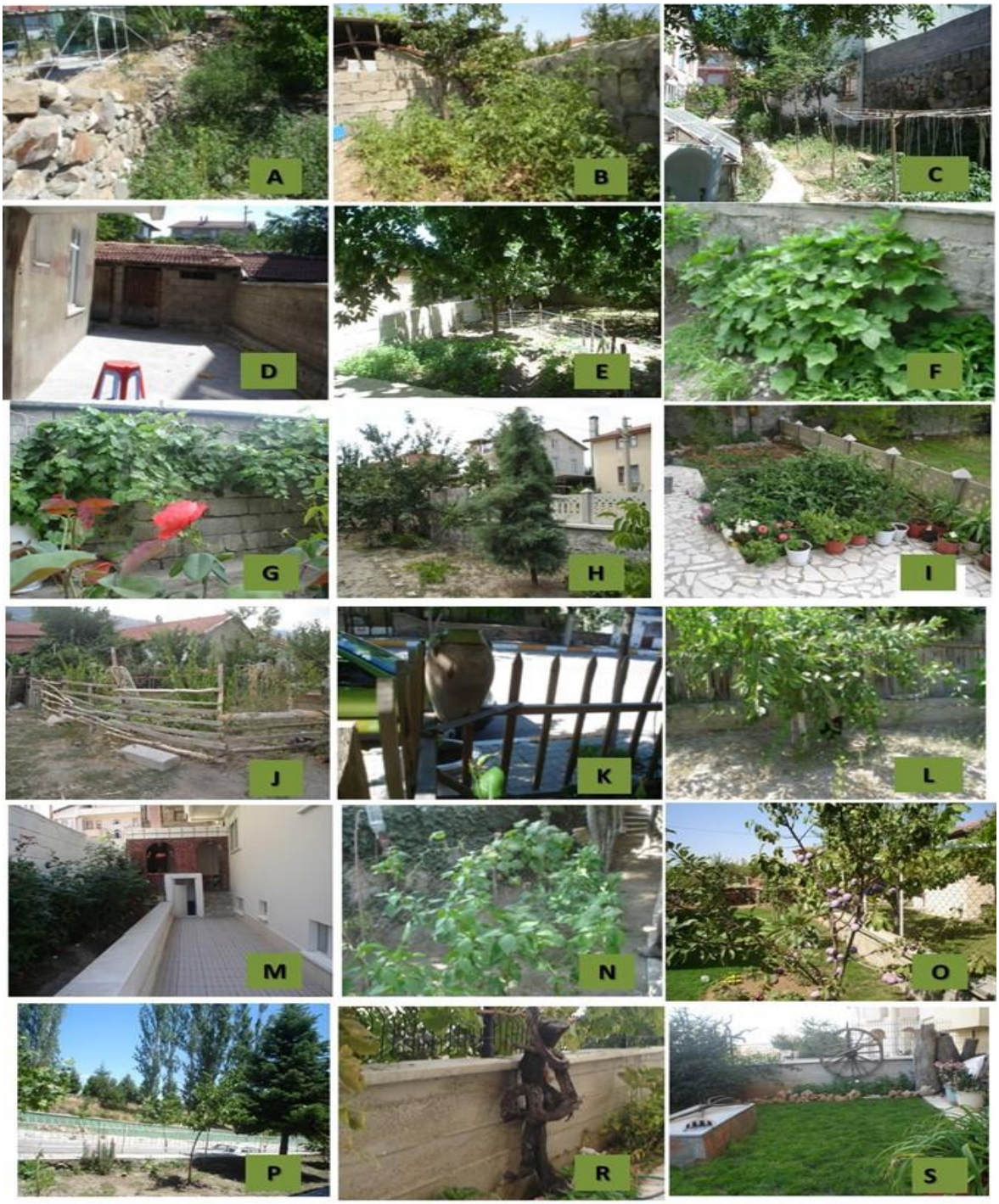

Figure 4. General views of some detached family house garden's walls (walls of- **A:** mortarless stone; **B:** Bare briquette; **C:** Stone-briquette; **D-E:** Bare briquette; **F:** Bare concrete; **G:** Bare briquette-plant combinations; **H:** Bare stone-concrete; **I:** Concrete blocks; **J-K:** Wood**; L:** Bare concrete-wood**, M:** Plastered briquette; **N:** Wire; O: Briquette-wire; **P:** Stone-metal; **R-S:** Concrete-metal).

Some aesthetic and functional garden walls could be seen in Figure 5. These surrounding structures look like functionally designed and constructed. Home owners consciously constructed their garden with various elements such as; plastered briquette (Figure 5 A); concreted (Figure 5 B-D), stone-metal (Figure 5 E) and concrete-metal (Figure 5 F). However, these walls have also plant wrap on them to make an aesthetic and greenery apparency at front of homes.

Figure 5. Front views of some detached family house garden's walls (walls of- **A:** plastered briquette; **B-D**: Concrete and plant on it**; E:** Stone-metal plant on it; **F:** Concrete-metal plant on it).

However, these surrounding elements seen in Figure 5 mostly had combination of live (plant) and inanimate materials used together in the surrounding structures. While vegetative surrounding elements have constantly changing properties, inanimate elements do not have this property and there is an invariance in their size, form, color and texture. It has proposed that the surrounding elements made with combination of inanimate and live material cannot be achieved aesthetic and functional results immediately, but it can be achieved in a very short time.

4. Conclusions

It has already mentioned in above that different expectations and demands on home gardens by users. However, one of the best ways to design house surrounding elements (walls, fences) with using basic landscape design approaches. Moreover, it is important to design with realistic sense, versatile functionality and succeeded for most of the users. Unfortunately, there is only limited number of gardens found to be appropriate design and landscape practice techniques applied in detached family single houses located in Isparta city center. It is most probably due to small size lands (20 to 500 m^2) with limited knowledge on modern gardening techniques and unwilling to spent costly work for responders. The construction of surrounding elements must be considered with the architectural form and understanding of the environment in which they will be used aesthetically. In addition, most of the garden's do not have appropriate drainage system for eliminated the hydrostatic pressure and improve the stability of the soil behind the wall. Therefore, attention and importance should be given to traditional and aesthetic features in their planning. The following recommendations could be made in the context of the detached family house garden's for Isparta city:

1. It was realized that the primary aim of use of surrounding elements in gardens is to provide privacy. However, it was found that many of surrounding elements had no proper function established rather than negative appearance. Some of these gardens' walls are bare that should be veneered with stucco, masonry, or special overgrown with plantings to make its attractive.
2. The cold images of surrounding elements could be eliminated in some degree with planting. Thus, could be possible to make a balance to be achieved between the structural elements and the green texture, unity was formed and at the same time. Some of the suitable plants for that purpose could be suggested as; Wall ivy

(*Hedera helix* L.,), Virginia creeper (*Parthenocissus quinquefolia* L.,) Chinese Wisteria (*Wisteria sinensis*), Trumpet vine (*Campsis radicans* L.), Italian woodbine (*Lonicera caprifolium* L.).

3. The cuddling and climbing plants cannot rise without a support and usually spread horizontally on the surfaces. Hence, the selection and use of these plants', leaf type, flower and fruit color, shade properties, cold and drought resistance, autumn color status, herbaceous or woody type should be taken into consideration.
4. It could recommend for inclined gardens that terracing is useful approach for steep slopes and it gives a symmetry to the land and control erosion some level. However, on milder slopes, swales and berms could be built to slow down the runoff and cause it to infiltrate. This is also applicable approach for creating visually pleasing lines in the landscape and double as raised beds for plants.
5. Fabric and mulch could also be installed as an aid to establish ground covers and prevent the continued loss of soil for slope lands.
6. While the surrounding elements are planned at different heights according to the purpose of use, the height of these elements should be above and/or below but in not in eye level. Otherwise, it looks not well and impact to divide the space in two part.
7. A number of the walls made with stone that many of them not well constructed even not mortared. However, the fitting the stone is exacting work and making mortar joints look natural requires experience. Hence, masonry requires skill to hit the visual standard and aesthetic appearance.
8. The mortarless stone, metal or wooden walls don't offer much holding power. Hence these walls (i.e. stone, metal or wooden) should be built on a gravel-filled trench dug below frost line to make strong against soil lateral pressure.
9. The walls should be considered to be carefully modified to decrease pressure on walls. Dry-stacked gravity walls should be useful above stone and/or cemented basements that are somewhat flexible and do not require a costly material.

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