Landscape Design to Three Residential Complexes in Sulaimani City

Ali O. M. Sharbazhery Lecturer - Hort. Dept Coollege Of Agr. Sci. Univ. Of Sulaymani Nigeen Najmaddin Mustafa Asis . Lecturer - Floriculture . Dept Agriculture Technical Institute - Bakrajo

Absract

With the development and evolution of human technology in the aspects of life, such as buildings, special attention was paid to the gardens and open spaces, therefore they became an important part of the residential complexes. The research was conduccted in three samples were German Village, Hawari Zanko and Kurd City in Sulaimani city, during the periods between Mar. 15 th 2015 to Feb. 15 th 2016, to know the area of the green spaces, the gardens and its aesthetic aspect, the open spaces and the various recreational activities, as well as the necessities for maintenance services and their design in light of international and local standards . In theoretcal framwork were clarified the concept of green areas and gardens in residential complexes, the various recreational activities of gardens and its efficiency inside residential complexes and demonstrates the concept of landscape design with the characteristics of design and international and local standards for green areas . In the case study contains the field research on the analysis of the reality of green areas and gardens comprising personal observations, interviews, blueprint analysis through the use of three samples from the residential complexes in Sulaimani city and questionnaires which we calculated in percentage form, statistical analysis and compared them to the actual area of green spaces implemented in the residential complexes. The research obtained several objectives, the most important of which is that the green areas, studied inside residential complexes were not according to standards, neglected and used as storage for generators, water tanks, and garbage. These spacious areas were not taken advantage of for rest and recreation like strolling areas, children's playgrounds, ponds and water fountains. We could see that the small area of green spaces is not sufficient for the needs of the residents. Also the results of three samples showed that the area of green spaces implemented was not sufficient, German Village contained 34% green areas as compared to Kurd City which only contained 15% and Hawari Zanko 6%. We could see that German Village is almost sufficient, and 65.35% of residents thought the presence of green areas was "bad" and 97.3% said that there are no children's playgrounds in the complexes, while 65.82% were not pleased with maintenance and services, and 77.66% said the presence of sitting areas was not enough, and 80.82% were not pleased with the amount of walkways, while 84.1% thought that the areas for exercise and fitness were not sufficient. During analysis of results the research reached several recommendations and advices that can be beneficial for the blueprint design of gardens and green areas of residential complexes. It also contains the redesigning of some of the vacant and neglected areas of all three complexes, according to the needs and desires of the inhabitants, with the application of local standards as much as.

Keywords : Landscape Designs in Residential Complexes, German Village, Kurd City, Hawari Zanko.

هندسة وتصميم الحدائق في ثلاث مجمعات السكنية داخل مدينة السليمانية

نكين نجم الدين مصطفى مدرس مساعد – قسم الزينة معهد التقنى الزراعى- بكرة جو

مع تطور التكنلوجيا في مجالات الحياة المختلفة ومنها العمران, ازدادت أهمية الحدائق والفضاءات المفتوحة اذ أصبحت الحديقة الجزء المكمل لأي مجمع سكني . اجريت الدراسة في ثلاثة مجمعات السكنية داخل مدينة السليمانية وهي القرية الالمانية،

علي عثمان محمد شاربازيري مدرس – قسم البستنة كلية العلوم الزراعية - جامعة السليمانية

الخلاصة

ISSN 2072-3875

كورد ستى و هواري زانكو ن، خلال فترة مابين 15 آذار 2015 الى 15 شباط 2016, من أجل معرفة المساحات الخضراء والجانب الجمالي للفضاءات المفتوحة وانواع فعالياتها الترفيهية واحتياجات الخدمات ، والى أي حد تم الأخذ بنظر الأعتبار القواعد والمعايير العالمية والمحلية في تصاميمها . في الاطار نظري للبحث تم توضيح مفهوم ومصطلح المساحات الخضراء والحدائق داخل المجمعات السكنية, كذلك تصنيف المجمعات السكنية وأهمية وفوائد الحدائق ووظائفها وتأثيرها على الجوانب الصحية والنفسية للأنسان. الفعاليات الترفيهية المختلفة داخل الحدائق وقدرات استعمالها داخل هذه المجمعات السكنية. مع مفهوم هندسة وتصميم الحدائق، المعايير العالمية والمحلية للمساحات الخضراء. كذلك اساسيات التخطيط وتصميم المساحات الخضراء ومكونات الحدائق داخل هذه المجمعات والعوامل التي تؤثر على تصميم الحدائق. اما الأطار العملي للبحث شملت تحقيق وتحليل واقع حال الحدائق والمساحات الخضراء لثلاثةنماذج مقترحة من العمارات والمجمعات السكنية المنفذة في مدينة السليمانية عن طريق الملاحظات والمقابلات الشخصية والأستبيان وتحليل المخططات المعمارية. ومن أهم النتائج التي توصل اليها البحث :في العينات الثلاثة قيد الدراسة لم تتم الأستفادة من المساحات المخصصة للحدائق والأماكن الترفيهية لل تم اهمال جزء كبير منهًا وخصص بعضها للأغراض الخدمية مثل المولدات الكهربائية او اماكن جمع القمامة او وضع خزانات المياه، كما لم يتم انشاء اماكن مخصصة للراحة والجلوس او العاب الاطفال او البحيرات او النافورات، لذًا نجد ان المساحات الخضراء ومكونات الحدائق في العينات قيد الدراسة لم تحقق الحد الادني من مستوى الطموحات والاحتياجات الترفيهية للساكنين. لذا من الضروري ان يهتم بهذه الاجزاء اثناء عملية تخطيط وانشاء المجمعات السكنية حسب المعايير من أجل راحة السكان وتلبيه احتياجاتهم الترفيهية والنفسية اليومية كذلك من خلال تحليل المخططات المعمارية للعينات لثلاث وجد أنه تم تخصيص جزء قليل من الحدائق والمساحات الخضراء ،اذ بلغت النسبة في القرية الالمانية 34% من المساحة الكلية للقرية,وفي كورد ستى 15 % أما في هواري زانكو فألنسبة هي 6% فقط. اضافة الي ذلك اثناء عملية الأنشاء والتنفيذ لهذه المجمعات النسبة المنفذة أقل من النسب المخصّصة في التصميم المقترح. ولهذا من خلال الأستبيان لساكني المجمعات الثلاثة ان نسبة 65.35 % من المستبينين يرى بأن الحدائق والمساحات الخضراء داخل مجمعاتهم سيئة , كذلك أماكن لعب الأطفال سيئة بنسبة 3. 97. % ، أما جانب توفر الخدمات في هذه المساحات فأن نسبة 83. 65. % من الساكنين أيضا يجدونها سيئة. كما تظهر من نتائج الأستبيان ان السكان يفضلون وجود بعض الفعاليات الترفيهية في حدائقهم مثل أماكن الجلوس والراحة بنسبة 66 .77% , وأماكن مخصصة للتجوال والمشي (82 . 80 %) , كذلك يفضل 1 .84 % أماكن مخصصة للرياضة والفعاليات البدنية في مجمعاتهم, لذا اثناء عملية التخطيط والتصميم لحدائق المجمعات السكنية يجب ان تؤخذ بنظر الأعتبار ر غبات واحتياجات الساكنين ومن خلال النتائج والاستنتاجات توصل البحث الى عدة توصيات واقتر احات للأستفادة منها في عملية تصميم الحدائق والفضاءات الخارجية المفتوحة فى المجمعات السكنية والمتعددة الطوابق للشركات والجهات المعنية بهذه العملية مستقبلًا. كذلك وضع تصاميم جديدة لثلاثة مساحات مخصصة للحدائق ولكل من مجمع من المجمعات الثلاث قيد الدراسة والتي كانت متروكة اومهملة اوغير مصممة وحسب الاحتياجات ورغبات الساكنين وذلك بالأعتماد على المعلومات التي تم الحصول عليها خلال مدة الدر اسة .

الكليمات الدالة : هندسة وتصميم الحدائق في المجمعات السكنية ، القرية المانية ، كوردستي و هواري زانكو

Introduction :

Sulaimani city was founded in 1781 by Ibrahim Pasha, one of the princes of Baban Emirate and he moved the center of the emirate from (Oala Chwalan) to Sulaimani, it became the capital for a long time, the history of making gardens in Sulaimani belongs to the beginning of composing the city and especially around the princes palaces where there were ruins until 1920 which was as a public garden called Bakhi Mili with area of 2-3 hectares near (Saray field) now (Zand, 2008). If we look at the cities of Kurdistan region, we can see that in the last 2 decades the cities progressed greatly especially during the reconstructions, one of those cities was Sulaimani city, where more than (200) new housing quarters, especially apartments were built, due to the lack and high prices of land.

Landscap design is known by its natural scenery, or it is the product composed by man-

made elements (Laurie, 1975). The gardens are the God's paradise on earth, people are enjoying on entreating themselves in it, and rushing and relaxing themselves when they are bored and nervous, they find themselves under the shade of trees, comfort, calm and feel above the grasslands, green surfaces, between flowers and roses, 75% of garden visitors feel comfort and joy while they are there (Dunnett and Qasim, 2000), the importance of the gardens and their benefits such as: health value. aesthetic function, constructional function (engineering), recreational and social function of green areas and economic benefits inside the residential complexes (Ward Thompson et al., 2012 ; Coombes et al., 2010 ; Ulrich et al. 1991; Crosby and Rose, 2008; Robinette 1972; Woodward, 2001 and Bennett and Swasey 1996).

Recreation means the activity renewal by changing the atmosphere and routine to bring

back the activity of mind and thought and the anatomical functions in human body. Recreation and entertainment is one of the functions that gardens introduce to the residents of the complexes or quarters in the residential areas, these activities such as: sitting, walking, swimming, picnic or barbeque, running, biking, getting out door and relaxing, nature appreciation, landscaping, outdoor meeting, reading, birthday parties, children play area (Simonds, 1983; Helstine and Holborn, 1987; Web, 1994; Jefferson ,2006Thorneas, 2008 and Ransom, 2008).

There is an area for recreation in the neighboring residential areas, which is calculated based on the number of neighboring residents, standards in this area are 4.2 m²/person of public garden in the Arab Republic of Egypt. Global rates of the proportion of open areas in the neighboring residential areas for the following countries are as follows: England 26%, Germany 37%, and Hungary 15%. Planning rates for open areas in many of the industrialized countries range from 4200-2100 $m^2/1000$ inhabitants. About 0.6 m^2 /capita is allocated from public parks for individuals, while 3000 $m^2/5000$ is necessary for residential space and adjacent gardens (Hussain, 1975).

Design considerations must take into account before the garden design process, such as: local climate, prevailing breezes and the microclimate will influence sites plant selection, growth and the gardens use, soil and subsurface conditions are important as the growing medium for plants, providing a suitable base for pavements and foundations. Site and surrounding, considers the sites previous uses for interesting natural, historical or cultural features. The purpose of the garden establishment or use and purpose. Common uses for outdoor spaces include: entertaining, cooking, swimming, playing, relaxing ... etc . The customs and traditions in the region must be examined, because it directly affects the design of the garden. The desire of the owner or human needs and what elements would you like to include. Finally information about landscaping *cost* and ideas for saving money (Laurie, 1975).

There is many study on residential green areas such as Noori (1989) study to the functional proficiency for green areas in residential areas in Amara city, which depended evaluation of function on proficiency for green areas in residential areas according to a group of variables such as social variables and weather performance for those areas and continuation of planting element in them. Also Darder (2000) sees that the designing of the green areas as one of the visual arts which has its own aesthetic discipline and various different functions in Cairo city. And Abdulqadir (2006) study the different ways to install buildings and functional and visual formation for residential complexes so that it shows the grounds of design and planning residential spaces and general components of them.

Research problems:

The problems arise from an increase in the number of multistory residential complexes in the cities of the Kurdistan Region, especially Sulaimania, increases in the number of residents in a limited area, and the negligence of the gardens and recreational areas:

1. The lack of clear local international standards and its effects on the design of open spaces in new multilevel residential complexes in sulaimani.

2. Failure to take into account the residents' views on open spaces, their needs and recreational activities, as well as the absence of entertainment activities.

3. The lack of attention in choosing the types of plants and vegetation and its use in gardens in these residential complexes.

4. The lack of previous research studies on the design of gardens in these new complexes in the cities of Kurdistan, recognizing the problems that arise from its designs.

Research objectives:

1. To conduct the actual reality of the gardens open spaces and recreational activities through personal observation, plan analysis, architectural designs, and personal interviews along with questionnaires.

2.To identify the kind of entertainment activities in residential complexes around the world and taking

advantage of them for present residential complexes and in the future.

3. To conduct a questionnaire for the residents in these residential complexes on their opinions, needs and

their preference for recreational activities, and its effects on their age, gender and educational and

cultural status.

4.To reach several recommendations in order to address some of the problems in the gardens and open

spaces of the residential complexes, and working on the architectural designs for some of the chosen

areas of the designated residential complexes, and depending on the results of this research.

Case study

The research was conduccted in three samples were German Village, Kurd City and Hawari Zanko in Sulaimai city during the periods between 15th Mar. 2015 to 15th Feb. 2016, Using four methods of data collection, namely, personal observation, analysis of architectural designs, interviews with officials, and questionnaire with residents .

General description of sample :

German village is located on the Malik Mahmud Street, across Twimalik neighborhood, (Map 1). It was designed by the local Nalia Company, and it consists of German Village, complexes are made up of (8) buildings, each of these buildings is ten floors, and each floor houses four families, (104) villa, and (51) houses. The total number of houses that are occupied by residents is 850 houses. German village contains kindergarten, primary school, daycare, supermarkets, and also consists of gardens distributed among the open spaces. The total area of the entire project is (167820 m^2) while the total area of the green spaces is (57059 m^2) and the total area of the open space is (134256 m^2) .

Kurd city complex is located near Malik Mahmud street in the southwestern part of the city, (Map 2), the complex consists of eighty residential buildings, of which there are three types and it is composed of (960) residential units located on (175,000 m²) of land, (15%) of which is occupied by green spaces, while open spaces makes up (35%), (6%) actual green spaces and small gardens are distributed between the apartment complexes.

Hawary Zanko project located in Sulaimani-Kirkuk main road which includes (140) entities (houses), which have been started implementation in May 2^{nd} 2004, by AGS Turkish company, after them the UNESCO Organization started to manage the project, and finalized in 2010, (Map 3). The total area of the project is (217.501) m², and only (6%) m² has been provided for green area. No gardens and green areas can be found in the project.



Environmental conditions of the city of Sulaimani:

The environmental conditions play a key role in the planning of parks, gardens and their designs, and its difference from one area to another, there is one difference in design processors, natural and physical components for the park. Whatever the conditions of climate and kind (Table 1), when planning and design, the designer seeks to generate an appropriate environment for human life, through control of all the elements of the climate by design processors and different climatic and selection of appropriate natural and physical components to this purpose (Dahl and Molnar, 2003). Although the city of Sulaimani, which has an area of 1200 km², it is located between the Latitudes of 35.55 -36.55 N, and the Longitudes 45.55-46.55 E, with an altitude of 853 meters above sea level (Stevenovic and Markovic, 2003). Soil testing in Sulaymani region are the soil acidity (pH) is between 7.6 to 7.8 and the amount of calcium carbonate is between 169.5-228.2 g/kg, the degree of electrical conductivity is 1.65-1.54 Dis Siemens/m. While the class of soil texture did not differ according to the layers and are clay, as the amount of organic matter between 2.15-7.77 g/kg (Faraj, 2007).

Table (1)	Metrological	Data of	Sulaimani	city (2	2014 - 2015)
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Years Monthe		Temperature c° Humidity		Precipitation Depth		Sunshine Duration		Wind		evap.			
rears	wonuis	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	January	12.1	3.4	79.1	45	30.5	0	8.5	0	0	0	3	0.2
	February	12.4	3.9	70.7	32	26.3	0	9	0	4.6	0	7.7	0.1
	march	17.9	8.9	76.5	39	50.4	0	10.2	0	3.3	0	7.9	0.2
	April	24	11.4	79.7	38	13	0	11	0	2.3	0.5	9.2	2.3
	Мау	31.1	18	56	22	25.5	0	10.8	0	2.3	0.3	11.2	1.5
2014	June	36.9	23.1	38	17	0	0	11	1.4	5.1	0	17.3	8.2
	July	40.2	26.6	35.8	16	0	0	11.3	4.7	5.6	0	19	7.7
	August	41.1	26.6	32.1	14	0.2	0	11.1	6.8	3.5	0.3	14.7	5.2
	September	35.3	20.9	42.5	19	0.2	0	10.6	1.9	2.4	0.3	10.4	5.2
	October	27.5	15.4	72.3	40	14	0	10.3	0	3.6	0	11.8	1.3
	November	18.2	8.2	82.8	55	20.9	0	8.8	0	5.1	0	6	0.1
	December	15	5.8	93.4	66	46.4	0	8.5	0	2.5	0	7	0.6
	January	12.7	3	89.4	61	33.5	0	8.5	0	0	0	3	0.2
	February	15.3	4.1	88.4	55	27.8	0	9.5	0	4.6	0	7.7	0.1
	march	18.7	7	84.8	47	25.6	0	10.8	0	7.1	0	6.8	0.6
	April	24.2	9.9	80	36	49.5	0	11.4	0	2.8	0	8	0.9
	Мау	32.1	17	59	21	16.6	0	11.2	0	2.3	0.5	9.9	1.3
	June	39	22.1	45	19	3.7	0	11.6	0.6	5.1	0.6	17.3	4.5
2015	July	42.5	27.1	35.3	16	0	0	10.6	1.4	3.5	0.3	14.7	6.6
	August	41	21.7	46	9	0	0	11.2	0	5.5	0.3	14.4	6.1
	September	38	18.5	56	9	0.2	0	10.6	1.9	2.4	0.3	10.4	5.2
	October	33.8	8.5	91	15	14	0	10.3	0	3.6	0	11.8	1.3
	November	21.5	0.2 -	91	25	20.9	0	8.8	0	5.1	0	6	0.1
	December	19.4	1.5 -	89	17	46.4	0	8.5	0	2.5	0	7	0.6

Data collection

We obtained accurate information on each of these three samples, from (Mar. 15 th 2015 to Feb. 15 th 2016), It was continued to collect information by visiting the sample locations. Collecting this data entailed four different steps, which involve observation, questionnaires, personal interviews and analysis of the architecture plans. **A- Observation:** the sample locations were visited on many occasions for each sample, an attempt was made to study the reality of the gardens, its parts and its impacts on the complexes, and the following observations were made:

1. The garden areas, open spaces, green areas and the areas for entertainment activities (Kids areas, resting areas, fitness areas).

2. Irrigation system, and water sources.

- 3. Wind barriers.
- 4. Type of agricultural soil

5. Number of apartments, houses and villas in each residential complex.

6. Road structures and pathways.

7. Man-made structures, each complex contains benches, fountains, pools, kiosks, supermarkets, lighting

poles, trash bins, and traffic signs.

8. The most important points that observed were during the visits to those complexes.

B-Personal interviews: the information was collected from specialists, directors, engineers, and the supervisors of each of those projects, along with the directors of each of the companies in charge, who gave us very useful information.

C- Questionnaires: involved a number of various relevant questions that helped the surveyor to identify the problem set out in the research. Surveying also serve as a direct communication, played an important role in design studies, and accomplishes the goal completely and clearly, as well as enabled the surveyor to accurately interpret the data, and asked questions of the participants according to their educational status (Qindilgi, 1993).

The participants were randomly chosen from each of the complexes (Appendix 1) of both genders, different educational statuses, and forms were distributed among them, 85 forms for German Village, 15 forms for Hawari Zanko and 100 forms for Kurd City.

We have taken (10%) to represent the total number of the residents, even though (5%) is sufficient. After collecting and analyzing the data from the architectural plans and the results of the survey, and depending on visual analysis of the notes, and after

visiting and researching the different areas like the gardens, the open spaces and the green areas of all three complexes, we compared the results, analyzed the statistics, and calculated the percentage of these parts according to the wishes of the residents. According to the requirements and wishes of the residents, and international and local standards, we decided to plan and re-design some of the areas of the complexes.

Results and Discussion

1- Observation results and discussion :

-German Village : after several visits to the German Village, we noticed a good number of trees planted on the sidewalks along with several areas of sloped land designated for trees. To an extent, the topography of the land was taken advantage of, and the sloped areas were kept the same and covered by natural vegetation, providing a nice view for its residents. There are also several small gardens besides the residents have made for themselves (Figure 3).

After meeting with the director of the company in charge (Nalia Company) and the designers of this complex, it was noticed that German Village II contains water wells that are used for the green areas, along with three water storage tanks and an irrigation system for watering the plants. However, due to its vast area, the complex still has water problems. We also noted lighting poles used to brighten the walkways at night. There are also no pools, fitness areas, recreational or rest areas for residents of the complex, only a few small play areas for children (Figure 2).

With respect to the land, only a depth of (40-50 cm) is agricultural soil suitable for farming. This soil has been replaced by agricultural soil and any depth more than this is not suitable for gardens and trees. If we look at the site plan, we can see that a large area has been designated for green areas, flowers and lawns for residents. However, the reality is that this has been poorly implemented due to the designated green areas being used as parking lots, generators, service areas or left ignored. There are only a small variety of trees

planted throughout the complex, therefore creating a sense of repetition and boredom.

-Kurd City: Concerning the residential complex of Kurd City, we noticed that there are no green areas, open spaces, gardens, flowers or lawns. There are no play areas for children, nor any area designated for it, along with no areas for pedestrians or recreational areas for residents (Figure 4).

There are also no fountains, or fitness areas. As a result of our visits to the complex, we noticed there are no trees anywhere in the complex, or in the surroundings of the complex only a small garden in front of apartment in Kurd City (Figure 5). No attention has been paid to the cleaning services and if we look at the site plans of Kurd City we can see that a large area has been designated for green areas and open spaces but has not been implemented just like the other complexes.

-Hawari Zanko: by visiting Hawari Zanko complex, we noticed that there were no gardens, green areas, children's play areas, fitness areas, or recreational areas for rest. There were no lawns, flowers or water

fountains, along with numerous areas of neglected land in the complex that were not used to benefit the residents (Figure 6). There were only a few trees on the sidewalks, along with several small areas of land that were created into gardens by the residents themselves (Figure 8).

In general, if we look at the site plans for this residential complex, we can see that, during the design process, a large area was designated for green areas, open spaces and gardens (Figure 7). However, these plans were not implemented with respect to the other areas of the complex, we can see that there is only one small mini-market that is not sufficient for the number of the residents.

After interviewing the chief architect and the others involved in the beginning of the design process, we realized that international and local standards were not implemented for the green areas, which explains the results of our questionnaires that the residents are not satisfied since it was not designed according to their wants and requirements, and there is no source of water for green areas.





2- Questionnaire Results and Discussion : The layout of our questionnaire was by forms, distributed randomly among both male and female residents. There were (86.67%) of male participants and (13.33%) female participants from Hawari Zanko, while there were (56.48%) male participants and (43.52%) female participants from German Village. Kurd City had (46.15%) male participants and

(53.85%) female participants, as shown in (Chart 1).

Concerning the first question (*Do you* think that green area is necessary in your residential complex): all of the residents of Kurd City and Hawari Zanko understand the importance and need for green areas since their complex lacks green areas as mentioned in observation results, while only (95.29%) of participants from German Village recognized the need for green areas.

The second question (What are the most important activities you would like to *practice*): shows that (80-86.66%) of participants from Hawari Zanko requested sitting areas and children's playgrounds as compared to German Village, where (100%) of residents requested fitness areas and (95.29%) children's for playgrounds. However, (100%) of residents from Kurd City requested playgrounds for children, and (93.84%) for strolling areas.

Therefore, we decided to redesign, create gardens, and designate large areas for children's playgrounds and recreational areas, large spaces for green areas, with special attention to flowers and walkways.

Question 3 (What time of the day you prefer to use your residential garden): shows that the majority of participants of all three complexes; Hawari Zanko (60%), German Village (95.29%) and Kurd City (100%) prefer gardens at night, while visiting gardens in the evenings comes in second; the highest number of which is (81.17%) in German Village and (100%) in Kurd City. Analysis of the answers from all three complexes shows that age and education degree are not factors and are not directly related. The result of this research allowed us to design gardens and open spaces and to pay special attention to lighting and planting those flowers and trees which are more beautiful at night, since the residents prefer going there at night,

In, question 4 (*In which season do you prefer to use your residential garden*): shows that the residents from all three complexes prefer spring/summer season to visit the

gardens, of which the highest percentage was recorded from Kurd City (98.4%) and their second choice was the fall/winter season.

Question 5 (*Areas of the green lands and garden in your complex*): the highest number (80%) of the participants from Kurd City answered "bad", while the lowest (4.70%) came from German Village.

Question 6 (*Garden aesthetic*): was about the beauty of the landscape, the highest number of participants (86.15%) from Kurd City answered "bad" for their landscape and the lowest number (4.70%) from German Village answered "bad" in response to the beauty of their landscape.

Question 7 (*Children pleasure areas and the degree of disturbance to the residents*): had the highest number of participants from Hawari Zanko (73.33%) and Kurd City (92.30%), since neither of these two complexes have children's playgrounds.

Question 8 (*Car parking areas*): we can see that the highest number from Hawari Zanko who answered "bad" (60.66%) and the highest number who answered "good" (47.05%). This demonstrates, what we previously mentioned in observation results, that the majority of the green areas have been used as parking lots.

Question 9 (*Pavement and footpath in the complex green area*): we can see that the highest number of participants (73.84%) answered "bad" from Kurd City.

By looking at this question 10 (*Services and maintenance in the green spaces*): we found that the highest number who answered "bad" was from Hawari Zanko (100%), and Kurd City (89.23%), since maintenance and services have been neglected.

Question 11 (*Markets and minimarkets*): the highest percentage who answered "bad" was from Hawari Zanko (86.66%) and German Village (89.41%).

This question 12 (*Lighting and adequate signs*): shows that lighting plays an important role in the beautification of the landscape

answered by the highest number of (53.33%) from Hawari Zanko.

The results of that question 13 (Cleanliness of open spaces and landscapes and the availability of necessary bins): are as follows, Kurd City had the highest number of participants (21.53%) who answered "bad'.

The result of question 14 (Particular places for families): on the presence of a special area for families, we can see that only Kurd City does not want this, and (40%) of them answered "don't like".

In question 15 (Sports and fitness activities places): on fitness areas, the highest number of participants (80-100%) from Hawari Zanko and German Village answered "like" and demonstrate that educational level is a direct factor, as shown in table (4.19).

Question 16 (Arbors and shaded areas): the highest number was from Hawari Zanko (80%), and German Village (75.29%), during redesigning of these parts, we paid special attention to family and individual sitting areas, as well as shaded areas for rest.

Question 17 (Sitting and relaxing places): on the importance of recreational areas, all three complexes agree on this point, Hawari Zanko (73.33%), German Village (87.05%), and Kurd City (15.38% .

Question 18 (Pond and fountain): shows that all three complexes wish for water and fountains with the percentages as follows: Hawari Zanko (100%), German Village (100%), and Kurd City (80%).

Ouestion 19 (Walking areas): we found that the highest number was recorded in Hawari Zanko (100%) and German Village (75.29%), on the presence and importance of strolling areas, however.

Question 20 (Swimming pool): which is about the importance of swimming pools, only (78.82%) from German Village (66.66%) from Hawari Zanko answered "like", however only (36.92%) from Kurd City answered "don't like".

Question 21 (Markets): we find that (16.92%) of Kurd City answered "don't like".

However, in question 22(Lawn and flower areas); and 23 (Tree strip around your residential compounds to prevent wind, dusts and reducing the noises): (100%) of all three complexes answered concerning the presence of lawn and flowers, neither age and status is educational а direct factor.



Chart 1 - Questionnaire distributed both male and female

Self description		GOOD	FAIR	BAD	DON'T KNOW	TOTAL	Chi Square	P Value
	20 - 29	7	1	39	1	48	Square	vulue
	30 - 39	5	3	41	2	57		0.003
ACE	40 - 49	3	11	19	2	35	20.019 **	
AGE	50 - 59	3	3	10	1	17	29.918	
	60 - 69	5	3	5	1	14		
	Total	23	21	114	7	165		
study qualification	High school	6	7	37	2	52		0.221
	College	9	10	59	2	80	6 802 m a	
	Higher degree	8	4	18	3	33	0.092 11.8	0.331
	Total	23	21	114	7	165		

TABLE 4.11 O	7 Children	pleasure areas and	l the degree of	f disturbance to	the residents
	// Children	preasure areas and	i inic ucerce or	uistui pance tu	une restaemes

Redesigning of some of the vacant and neglected areas according to the needs and desires of the inhabitants, with the application of local standards as much as. For all three complexes, wich put two designs for each complex (Maps: 4, 5, 6, 7, 8 and 9).

Conclusions:

- 1. Those areas from all three sample locations that were designated for gardens were not appropriate; rather they were simply areas that were not suitable for housing buildings.
- 2. The areas in all three sample locations that are nominated for gardens are not according to local or international standards for the designation of special region for open spaces and green areas. The areas are also not chosen according to the population
- 3. Most of the gardens were not built on the basis of garden standards, like the planting of only one type of tree as was found in German Village, or the few neglected lawns devoid of flowers, in which aesthetics was completely ignored, as seen in Kurd City and Hawari Zanko. A small number, only 12.67% of the residents approved of their complexes' flowers, and gardens aesthetics.
- 4. Disregard for variety in trees and shrubs in each of the three complexes and planting only one or two types of trees in repetition,

creates a sense of boredom and unsatisfaction.

- 5. The percent of green areas in each of these complexes are as follows: German Village 34%, Hawari Zanko 6%, and Kurd City 15%.
- 6. In each of the three sample locations, we can see that the use of water through fountains, waterfalls, water canals and water basins was completely ignored .
- 7. Due to the lack of parking lots, the majority of open spaces in the complexes have been used as garages, they only benefit as parking lots for the residents. This area for parking lots at the expense of green areas is too much, for example, 27% of the open space in German Village is used as a parking lot.
 - 8. As a result of our visits to each of the three sample locations and analysis of the architectural plans, we found that the spaces designated for gardens and green areas were not implemented in reality. 15% of the Kurd City complex was designated for green areas, while only 6% was actually used for planting several trees.
 - 9. In each of the three sample locations, maintenance and services are scarce and neglected, for example, 95% of resident from all three complexes found that garden maintenance is poor and lacking.

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- 10. There is disregard for the needs of residents from each of the three complexes and the lack of activity in the green areas, such as children's playgrounds, resting and sitting areas, and family recreational areas along with strolling areas. 76% of the residents from all three complexes desire places to sit and rest in the gardens. 84.4% desire fitness areas while 91.7% think it is important to have children's playgrounds. 80.8% request the presence of strolling areas. 91.71% of the residents living in residential area with multiple stories desire special family areas, especially during the holidays.
- 11. 98.2% of the residents of all three complexes are request to green areas, which portrays their strong desire for the presence of this important structure in their complex, as compared to 12.3% of residents from all three complexes who are satisfied with the amount of green areas currently present in their complex.
 - 12. In general, the soil from each of the three complexes is not fertile or suitable for plant growth , this is the reason the plants have not flourished.
- 13. Although there are landscaping elements within residential complexes, it is not

enough to improve the microclimate, since the trees and shrubs are not selected on a scientific basis.

Recommendations:

The recommendations that are presented by this research to the responsible authorities, as follows:

Recommendations for the planning authorities:

- 1. Revision of urban planning policy for open spaces and parks within the residential complexes, in particular complexes with multiple floors, and allocation of the portions for each individual.
- 2. There should not be any future development or expansion of the neighborhood and residential buildings in the area of the open spaces and gardens.
- 3. Choosing appropriate locations for gardens inside the residential complexes in terms of proximity to residential buildings or houses, and not in different, hidden or isolated areas.
 - 4. The development of channels of communication between researchers and stakeholders for topics on the planning and designing of parks and open spaces in residential complexes for future improvement.

Recommendations for the design authorities:

- 1. More attention to gardens, open spaces and green areas in residential complexes, especially those with multiple floors, as it is an important necessity and essential part of the overall design of any residential project so that the total building area is not more that 20% of the total area of the complex while open spaces should not be less than 80% of the gardens.
- 2. The design of gardens in residential complexes should be concerned with the considerations in order to create gardens for various leisure, sports, health, and social purposes for the entire population complex.
- 3. The designer should study the natural environment and climate of the location in detail, and the selection of trees and plants to fit the conditions of the region.
 - 4. Study of the psychological factors, customs, and traditions present in the residential complex before the design process.
 - 5. Paying attention the placement of wind barriers, around the complex, especially in the south and southwestern areas since that is the direction of the Sulaimani wind, in order to reduce noise and dust.
 - 6. The need to complete the basic three stages of the architectural planning and design process of open spaces and not neglecting the last phase of detailed design, which expresses the creativity of the designer for gardens in whole or in part, creating a feeling of open space with all its elements and components.
 - 7. Clarification of the structure of the circulation system in gardens and green areas within the residential complexes.
 - 8. Maintenance of visual clarification at intersections.
 - 9. Climate treatment for the gardens should be flexible and according to the seasons to allow control of the exposure to solar radiation, movement of air and humidity, by choosing a specific scheme, direction and nature of land and natural, physical and thermal characteristics of the components of the area and its reactions to the climate.
- 10. The importance for forestation in the open spaces to be used especially as walkways

around the buildings with deciduous trees, so as to provide efficient shade in summer .

- 11. It is necessary to focus on harmony and diversity when choosing garden plants in terms of their shape, weight, colors, smell and suitability to the conditions of the environment.
- 12. The importance of using water in all of its forms such as fountains, waterfalls, pools and sprinklers as a core feature in the cooling of the climate with ambient air that increases the impact of water cooling through the process of rapid evaporation.
- 13. Provision of an efficient irrigation system to maintain the freshness of the plants through the burial of the irrigation pipes under the roads and walkways at an appropriate depth to prevent damage.
- 14. Taking into consideration the engineering stages of maintenance and possibilities from the first design.
- 15. Provision of industrial and man-made components that are necessary to add beauty to the gardens, such as benches, signs, lighting poles and waste containers.
- 16. The need for attention to provide calm and soothing activities that is suitable with the customs and traditions of our societies.
- 17. Creating several places for children and all their needs to play inside the complexes with safety conditions.

18. Designing private parking spaces in residential complexes with the need to isolate it from the gardens inside the complexes.

19. Avoid planting trees and shrubs with pollens that cause allergies, toxic plants, plants with thorns or fruit trees in the gardens of the complexes.

20. Do not neglect the time needed for the growth of the plants, they should be planted with the beginning of construction, and the majority of the landscaping should be complete before the construction of the buildings inside the residential complexes is finished.

Recommendation for the executive bodies

1. It is necessary to implement the plans proposed entirely by the designer without any alterations to any of the components because it leads to deformation of the designs.

- 2. Working step by step in order and commitment to the appropriate farming dates during planting operations and other suitable times.
 - 3. Do not bury building waste under the garden areas since it will cause problems after planting, but rather clean and level the ground before planting.
- 4. When any change occurs in the design or components of the garden, the designer or those in charge must be notified and the changes should be marked on the project map.
 - 5. Allocation of sufficient funds for the purpose of construction and maintenance because the project remains in the company's responsibility for one entire year after its completion.
 - 6. The delivery of the plans, and information on the distribution of poles, water and electricity to the garden administration.

Recommendations for the Investment Authorities and the Ministry of Municipalities

- 1. Confirming that the open spaces and green areas are designed according to the local and international standards before giving license for the project.
- 2. Confirmation of the degree of implementation of the proposed designs for the green areas after the completion of the project.
- 3. The green areas in the residential complexes especially those with multiple stories should be according to local and international standards and the weather must be considered.
- 4. Directing the investment authorities to implement various activities in the gardens, like playgrounds, fitness areas and sitting areas, to reduce the crowded gardens of the city.
- 5. Directing the residents of the complexes to convert their roofs into green roofs, hanging plants in their balconies, and creating wall gardens, all to increase the percentage of green areas in their complexes.

Recommendations for the administrative authorities in the residential complexes

1. Attention should be paid to the maintenance of the gardens and its components by watering, weeding, preventing and killing bugs, cutting trees, mowing the lawn, fertilizing the plants and planting flowers according to the seasons.

2. The same type and size trees and shrubs have to be replanted whenever a tree gets damaged or dies, to maintain the primary design of the garden.

3. Maintaining the cleanliness of the gardens, sanitizing the playgrounds and preventing animals from entering the gardens, in order to maintain health and safety.

- 4. Monitoring those people who vandalize the gardens and irritate the residents through the use of cameras to maintain a calm environment, and using labels to inform residents on the use of the playgrounds and other areas of the complex.
- 5. Special staff and agricultural engineers are necessary to provide service and monitor the gardens according to need.
- 6. Preparation for any unwanted circumstances, such as water shortage, diseases, or any severe weather conditions, by providing special funding and agricultural equipment.

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Appendix 1 - Questionnaire

Tick the suitable answers or give the right phrases:

Q1/ Sex:, age:, study qualification: High School.....,

College:, Higher degree:

Q2/ Do you think that green area in necessary in your residential complex: Yes, Fair, No what are the most important activities you would like to practice ;Sitting places and relaxing...... , Foot path, place for exercise and Fitness equipment, outdoor play space for children

Q3/ what time of the day you prefer to use your residential garden? Morning, Afternoon, Evening, Night. **Q4**/ In which season do you prefer to use your residential garden? Spring, summer, Fall, Winter.

Q5/ Explain your opinion about green area and open spaces in your residential space concerning the following aspects:

	-			-
ASPECTS	GOOD	FAIR	BAD	DON'T KNOW
-Areas of the green lands and garden in your complex				
-Garden aesthetic				
- Children pleasure areas and the degree of disturbance to the residents				
-Car parking areas				
-Pavement and footpath in the complex green area.				
-Services and maintenance in the green spaces.				
-Markets and minimarkets.				
-Lighting and adequate signs.				
-Cleanliness of open spaces and landscapes and the availability of necessary bins.				

Q6/ Do you prefer the existence of the following facilities in your local open spaces and landscapes:

PARTS OF THE GARDEN	LIKE	FAIR	DONTLIKE
-Particular places for families.			
-Sports and fitness activities places			
-Arbors and shaded areas.			
-Sitting and relaxing places			
-Pond and fountain			
-Walking areas			
-Swimming pool			
-Markets			
-Lawn and flower areas			
-Tree strip around your residential compounds to prevent wind, dusts and reducing the noises			

Q7/ Problem found in your local garden.

Q8/ Any suggestion you have to develop landscapes, garden, and open spaces in your local garden.