



# Investigating the Role of Urban Management in the Area of Urban Green Space based on Health, Safety, and Environment Management System (HSE-MS)

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**Abstract:** *The present study aimed to plan urban green space based on Health, Safety, and Environment Management System, in a case study of municipality of district 13, with an emphasis on Peter Hall's theory of sustainable urban development. Attention to green space management in urban life is a subject that attracted the attention of urban scholars in the areas of contemporary urban development and architecture more than any other subject. The increasing importance of green space in growth and development plans is significant from two main perspectives: first, as a balancing factor in urban life in terms of environment, and also in terms of beautification of cities on one hand and a suitable place for spending leisure time for citizens on the other hand. This study has six fundamental hypotheses and questions. The research method was documentary study and survey research. The questionnaires was prepared at two levels of green spaces authorities and visitors to parks. The questionnaire for visitors was completed by 400 citizens and the other questionnaire was completed by 35 authorities of green spaces of district 13. The research results indicate that from the viewpoint of authorities of parks and green space in district 13 as well as citizens and visitors to parks, safety conditions and principles, health, and environmental status of parks and green spaces in district 13 are consistent with safety conditions and principles, health, and environmental standards, and all the proposed hypotheses were approved and the fundamental questions were answered. At the end, strategies and recommendations are provided regarding the management of parks and green spaces.*

**Keywords:** *Urban Management, Urban Green Space Planning, Safety Management System, Health and Environment, Sustainable Urban Development, Managers and Citizens.*

## INTRODUCTION

Cities as focal points for human activity and life, in order to be able to guarantee their sustainability, have no choice but to accept a structure and function influenced by natural systems. Meanwhile, green spaces as essential components of cities' figure, play an essential role in their metabolism, whose deficiency can cause serious disturbances in lives of cities.

The systematic thinking that today has emerged in the concept of sustainable development, especially in metropolitan areas, emphasizes the role of green space with its characteristics, along with proper understanding of its social, economic and cultural realities in every district (Mohammadi, 2007).

Obviously, in order to have a healthy and sustainable city, it is necessary to consider different aspects of urbanization with a systemic view, and to use scientific models to manage important sectors in order to improve the status quo.

Concerns about energy consumption and environmental damages can directly relate to the health status and urban conditions. Aside from global importance of urbanization, population consequences are related to this process. Despite the undoubted estimation that the increase in urbanization is closely related to a better access to (or, at least, more tendency toward) health and safety conditions in a number of rapidly growing countries in the world, this situation is rarely present, and it is limited to the developing world. Urban health has gained an important place in demographic and policy-making issues around the world.

What today at the dawn of the 21st century is considered a crisis for our cities, has made the face of cities ugly and disordered, and has turned the citizens into soulless, tired, and annoyed people is gradual rupture and destruction of the relationship between human and nature, which unfortunately has been less considered in recent years in urban development and urbanization system in the country. Accordingly, scholars consider one of the main ways to cope with urbanization problems as strengthening the relationship between urban human and nature.

Establishing a reasonable and sustainable relationship between human, city and nature, with a view to urban-environmental design in cities is one way to achieve sustainable development of cities. In this sense, green space plays an important role, because it is the most available natural element that can help urban human.

People go to parks for a variety of reasons, including walking, exercising, talking, meeting, playing, enjoying the nature and the clean air of the parks and so forth. However, the most important goal of building parks is to relieve people from noisy environments so that they can use their leisure time in natural environment or, in fact, the goal of designing parks is searching for necessary factors in creating appropriate urban green spaces in terms of environmental perspectives, leisure time, aesthetics, cultural, and so on. Designing parks and urban green spaces should be in line with meeting the necessities of urban living, responding to the needs of citizens from different age groups and obtaining valuable patterns that have cultural concepts resulted from within the community. This can be used in order to create a healthy and valuable urban space (Adl, 2004).

Recent events in urban parks and not observing the health principles have raised some concerns that are very important from a social point of view. Mature trees, while being beautiful, can be dangerous in case of falling or having their branches fell. Trees in public spaces should be maintained with public funds; a cost that many municipalities immediately reduce when they face budget deficits. Selection of inappropriate species of trees can be problematic. Some species of trees are difficult to adjust with compact soils and poor air quality in urban areas. Some others create root networks which damage underground networks and cause cracking of sidewalks or damage to foundation of buildings.

Creation of a healthy, beautiful and relaxing environment in parks, maintaining parks' environment and taking required steps to prevent environmental pollutions in parks, given the importance of parks and green spaces, are among the things that need to be considered.

In recent years, Health, Safety, and Environment Management System (HSE) has been proposed as a powerful and comprehensive management tool, but has mostly been used in developmental and industrial projects. Considering that this system, by simultaneously examining three factors of health, safety and environment, provides a suitable ground for establishment and implementation of environmental management standards and health and safety standards, also, by an integrated approach, provides a sustainable ground for development, therefore, it can be one of best management systems for managing parks and green spaces. Hence, the present study, by case study of parks and green space of Tehran municipality of district 13, examines the issue of urban green space planning based on Health, Safety, and Environment Management System (HSE-MS) and tries to find the answer to this fundamental question that what are the

opinions and views of managers and authorities of parks as well as citizens about safety, health and environment of parks? Are the safety, health and environmental conditions and principles governing green spaces and parks in district 13 in accordance with standard principles?

This study has one main goal and some minor goals:

The main goal:

- Examination of urban green space planning based on Health, Safety, and Environment Management System (HSE-MS) in Tehran municipality of district 13

The minor goals:

- Examination and recognition of safety conditions and principles governing parks and green spaces of the district from the viewpoint of authorities and citizens of the district
- Examination and recognition of health conditions and principles governing parks and green space of the district from the viewpoint of authorities and citizens of the district
- Examination and recognition of environmental conditions and principles governing parks and green spaces of the district from the viewpoint of authorities and citizens of the district
- Providing strategies in order to improve the status of HSE in parks and green spaces

This study has six hypotheses that have been tested empirically:

1. It seems that from the viewpoint of authorities, **safety** conditions and principles governing parks and green spaces of the district are in accordance with requirements and principles of standards.
2. It seems that from the viewpoint of authorities, **health** conditions and principles governing parks and green spaces of the district are in accordance with requirements and principles of standards.
3. It seems that from the viewpoint of authorities, **environmental** conditions and principles governing parks and green spaces of the district are in accordance with requirements and principles of standards.
4. It seems that from the viewpoint of citizens, **safety** conditions and principles governing parks and green spaces of the district are in accordance with requirements and principles of standards.
5. It seems that from the viewpoint of citizens, **health** conditions and principles governing parks and green spaces of the district are in accordance with requirements and principles of standards.
6. It seems that from the viewpoint of citizens, **environmental** conditions and principles governing parks and green spaces of the district are in accordance with requirements and principles of standards.

### **The concept of safety, health, and environment management system**

The increased number and severity of occupational accidents, the increased number of people suffering from diseases, poisoning and occupational cancers, as well as the increased environmental crises imply insufficiency of activities related to employees' health and environment. In these conditions, only within the framework of a predefined system, the desired goals can be achieved. Results of several researches indicate that most of the safety, health and environmental problems are related to the poor intervention of senior management, lack of systemic methods, and lack of systematic thinking in this sector. Observing health, safety and environment management system standards is necessary to create interaction and establish effective communications with other countries in the field of activities related to supplying, maintaining and improving health level of employees and environment. This system is a manifestation of full compliance of policies of an organization for global policies of sustainable development; and safety in work, occupational health and environment reflect the central role of human in safety and the necessity of maintaining his/her health and vitality in dealing with environment. By establishing safety, health, and environment management system and full observation of its principles and elements, a reduction in costs will be seen, which are imposed on the industry due to the occurrence of occupational diseases, accidents and environmental damages. The goal of creating health, safety and environment system is to achieve an objective management tool based on the existing standards that can accurately determine and effectively control the

potential and actual hazards existing in the area of professional health, safety and environment (Ghahramani, 2004).

This management system considers three factors of health, safety and environment, integrative, and provides a suitable ground for establishment and implementation of environmental management standards of ISO 14001 and occupational Safety and Health Standards of OHSAS 18001 (Adl, 2004).

In safety section, the whole system process is examined from safety perspective and potential risks, and project risk points are identified. Also, preventive measures which can reduce these risks and causing accidents, are proposed and implemented and then, appropriate methods are used in order to reduce, control and eliminate them.

In professional health section, all potential and actual factors, such as chemicals present at different stages of the project, as well as the duration of contact with them, influencing the health of employees, contractors, visitors, and others that are present in work environment of the organization, are examined. In addition, all characteristics of harmful factors, such as hazards, transportation, firefighting, first aids and material maintenance, and so forth are also identified.

In environment section, all executive impacts of the project in different stages on the environment of the district are examined. In other words, environmental aspects resulted from implementation of the project in the district are specified and the ways to achieve defined standards are expressed (Leghayee, 2010).

Health, safety and environment management system is a part of overall management system in an organization that, as most management systems, includes Planning, Implementation, Examination, Action, and Feedback sections.

✓ **Influences and advantages of health, safety and environmental discipline**

Advantages of establishment of HSE management system are as follows:

- Sufficient recognition of potential harmful factors in working environment;
- Providing a suitable ground for improving efficiency and organizational excellence;
- Developing a specific structure for HSE management and determining responsibilities;
- Making the health, safety and environment management system targeted and integrated;
- Providing a suitable ground for continuous improvement of HSE in the organization;
- Recognition of safety rules and regulations;
- Effective risk assessment and mitigation in order to control accidents;
- Reduction of direct and indirect losses due to accidents;
- Motivating employees due to their trust in management because of the efforts to provide a safe working environment;
- Providing a suitable ground for using potential intellectual capabilities of employees in order to strengthen HSE management;
- Providing grounds for healthy and effective competition;
- Possibility of self-assessment of organization to adapt to an HSE management system (Ayatollahi, 2001);
- Reduction of losses due to accidents including reduction of losses due to work stops, treatment costs, time wasting due to not working of damaged individual(s), time wasting due to concerns resulting from emergency relief, payment of compensations due to the permanent or temporary disabilities or death of employees, the amount machine breakdown or material waste, and thus, less waste in production, cost of training new staff that are replaced injured staff (Ebrahimzadeh, 2008).

✓ **Establishment of health, safety and environment management system in urban parks and green spaces**

Establishment of health, safety and environment management system in any organization needs culture-building and creation of active attitude in this area. Expansion of organizational structure, expansion of task

description related to deployment of system and addressing effective implementation of basics of this system should be prioritized. Educational planning in health, safety and environment issues, utilization of existing capabilities, and creation of coordination in the standards used, determination of audit and inspection methods, and determination of a method for managing assessment of potential harmful factors and its associated risks are among the factors influencing system establishment.

As all life affairs are managed scientifically, often industry's scientific management model is used and therefore, most of today's affairs, unlike before, are viewed industrially; for example, sports industry, service industry and education industry. In this way, various affairs such as sports and education are managed using the scientific method commonly used in industries. Therefore, in management of parks also the common practice in industries can be used, and health, safety and environmental issues in parks can be studied systematically (Adl, 2004).

The systematic approach to health, safety and environment management in parks, due to having pre-occurrence attitude toward incidents, can identify those risks before they become incidents, and after assessing risks and prioritizing them, they can be controlled; therefore, by implementation of systematic approach to health, safety and environment management in parks, it is possible to minimize the number of incidents and severity of their consequences.

The approach used to manage urban parks in the country is a traditional approach. In traditional approach, due to the prevailing post-occurrence approach, financial damages and damages to life caused by accidents in parks will be high; so, changing the traditional structure of managing health, safety and environment to systematic management seems necessary.

Based on the above mentioned reasons, Health, Safety and Environment Management System (HSE) that is used nowadays in the industry, can be a good option for management of urban parks (Ghahramani, 2004).

#### **Optimal management of health, safety and environment of urban parks**

##### **✓ Health management of urban parks**

Today, the importance of sanitation and observing health principles in public places and recreational spaces, including urban parks, is well-known. Management in urban parks means paying attention to health and sanitary principles, standards and facilities in parks, and taking necessary actions to prevent the spread of pathogens and the risks resulted from all factors that endanger the health of park visitors and staff. The most important issues that affect health management of urban parks include:

- Providing healthy and adequate drinking water in parks;
- Providing healthy foods at buffet or restaurant in parks;
- Providing enough trash bins with proper equipment in parks and proper collection of garbage in different times;
- Providing sufficient number of toilets and washrooms with proper equipment in parks;
- Removing pests (insects, rodents, ...) existing in parks;
- Observance of health principles regarding the use of pesticides and fertilizers by park staff;
- Continuous cleaning of parks;
- Appropriate sanitary conditions of parks' staff rooms; and
- Regular and continuous monitoring of health status of parks' staff (Arjmandi et al., 2008).

##### **✓ Safety and its management in urban parks**

###### **• Movement routes**

The design of a park has a direct impact on feelings of park's users about its safety. If a park has clear and comprehensible design, safety will increase in that.

###### **• Use of materials in terms of safety in the flooring of routes**

Choosing suitable materials for flooring of routes is one of the most important issues that a designer must consider regarding movement safety of pedestrians, especially the disabled, the blind and the elderly. In this regard, the most important issues that can be considered are:

- One of the safety issues in designing is appropriate width of the main routes of park (about two meters) for passage of emergency relief cars and other required machineries. This is very important in parks serving in the district level.
- Installing any kind of panels or barriers such as telephone booths, mailboxes, trash bins, drinkers, benches, directional signs, decorative structures, and so forth, which reduce useful width of the sidewalk must be avoided.
- The distance for planting trees and plants should not be less than 2.5 meters from buildings and passages of the park, because some plants due to their strong roots and sharp and dense branches may damage buildings or pedestrians in the park.
- In winter, due to snowfall and frost, many problems arise on pavements in the parks; so, in order to prevent incidents, steep slope must be avoided in designing of park routes, and snow and ice should be collected from surfaces (Ahmadi, 2008).
- Wide gutters created on some passages, must have shields, and also pits and ditches in paths must be recovered timely.
- In case of having bike path in the parks, these paths should be separated from pedestrian paths in order to prevent incidents. In the absence of a route for the rides, the entrance of motorcyclists and cyclists to the park must be prevented.
- Lack of emergency exit routes in different parts of park as well as traffic in some parts may create areas that can be effective in creation of conditions for occurrence of crimes as well as offenses. Therefore, several emergency and exit paths are essential for park safety .

- **Electrical and lighting systems**

Light is one of the most important factors for promoting safety in parks. Light can illuminate all over the park through emphasis on walking paths, main areas, and entrance and exit routes, and also can lead to using the park and enjoying it in dark hours of the night, and increase the efficiency of people.

- **Signs and panels**

Signs and panels are among the important components promoting security of parks, because people will feel secure where first, they know where they are and next, they know how they can go to the place. Hence, signs are useful when they create the sense of order and clarity in the park.

- **Safety of children's and adults' play equipment**

In order to have easy access to play equipment and to reduce the probability of people's collision to the existing equipment in the playground, the number of play equipment, especially in amusement parks, must be selected in proportion to the size of the playground, and the location, size and other features of the equipment must be appropriately designed.

- **Safety of lake, fountain, and pool**

One of the other very important issues in safety management of urban parks is attention to safety of recreation spaces such as lakes, pools or fountains existing in them (Esmaeeli, 2002).

✓ **Environment and its management in urban parks**

According to the definition of ISO 14001 standard, the term "environment" is a place including water, air, soil, natural resources, plants, humans, and the interactions between them, in which the organization operates; and the environment in this definition involves from within an organization to the global system.

The most important issues related to environmental management of urban parks are:

- Preserving and maintenance of park environment and providing a healthy, beautiful and relaxing environment;
- Taking measures to breed, handle, and improve vegetation situation in park;
- Use of good quality water resources to irrigate park's green space;
- Attention to the status of public park structures;

- Appropriate design of park components;
- The impacts of air pollution in the district on park environment and required measures in order to improve the existing conditions;
- Appropriate measures to reduce noise pollution in park;
- Appropriate measures to reduce waste pollution in park.

In addition, measures should be taken to reduce environmental pollution resulted from pollutants in park, which include:

- Use of proper methods to remove pests and diseases in park;
  - Use of low-risk pesticides in order to remove pests and diseases;
  - Observance of environmental considerations regarding the use of pesticides and fertilizers by park staff;
  - Treatment and disposal of human sewage of park (Ejmali, 2004).
- ✓ **Performance of Tehran municipality of District 13 in establishment of Health, Safety and Environment Management System (HSE-MS)**

Following the letter No. 8810/770497 dated 2009 entitled “Guideline for Establishment and Development of Health, Safety and Environment Management System (HSE-MS)” of Tehran Municipality and the letter No. 10/402241 dated 2012 entitled “Commitment of the region to start establishment of Health, Safety and Environment Management System (HSE-MS)”, as well as considering the measures taken by the mayor of Tehran following announcement of the policy of HSE management system of Tehran municipality by him, municipality of District 13, in order to improve management systems, considers Health, Safety, and environment Management System (HSE) as a part of the current total management system in the organization and has established this management system all over the district.

The purpose of establishment of HSE management system in municipality of District 13 along with other management systems is to provide a targeted method based on the existing standards in order to ensure that the potential and actual hazards existing in activities of municipality of this district regarding health, safety and environment are accurately determined and effectively removed or controlled.

Given that working in executive projects of urban management area, due to diversity, presence of various working groups, and lack of full familiarity of contractors and especially workers with the risks, has high potential of safety, health and environmental incidents, thus, addressing HSE issues in contracting operations is much more important. The growing trend of executive projects in the district and the increased employer expectations regarding HSE issues has exposed contractors to a wide range of health, safety, and environmental issues. Therefore, Municipality of District 13, in order to control engineering and management issues and problems of HSE, has established a project to manage and monitor performance of health, safety and environment of contractors, so that by applying proper monitoring of performance of suppliers and contractors, can improve HSE in the district and also, in order for adequate recognition of potential harmful factors in workplace, has tried to create an adequate ground for organizational efficiency and excellence, effective assessment of risks and reducing them, and maintenance and development of this system in 2014.

Tehran Municipality of District 13, in line with establishment of Safety, Health and Environment Management System and based on the agreement with Shahre Salem Company, has undertaken commitments in last year, and also based on the service description announced by Supreme Council of HSE Management System of Tehran Municipality, has accepted responsibilities in seven executive phases in order to establish HSE management system as follows, and by conducting an audit by CCPL Company in three phases, it was able to obtain Certificate of Competence of this system in previous year.

➤ **Description of the steps taken to establish HSE management system in District 13**

- Determination, introduction, and issuing the ordinance of the head, secretary and members of HSE-MS leadership committee and submitting it to the secretariat of HSE Management System of Tehran Municipality.

- Determination, introduction, and issuing the ordinance of the head and members of expert groups with presence of experienced experts from all organizational areas and units of the region in the following subjects:
1. Training (planning, implementation, completion and submission of training courses records)
  2. Identification of hazards and evaluation of risks
  3. Examination of documents
  4. Implementation and execution of the system
  5. Internal audit
    - Codification of regulations of leadership committee (composition, description of tasks and responsibilities, time periods of holding meetings, formality of the meeting, mechanism for notification, and implementation of approvals, and so on) and submitting it to all committee members after approval by secretariat of the HSE management system
    - Examination of organizational mission, vision, policy, organizational chart, and strategic objectives of the district in the areas of human resources, financial resources and clients related to HSE
    - Identification of performance measurement criteria in the area of health, safety and environment activities
    - Examination of establishment status of ISO9001, ISO14001, OHSAS18001 and IMS management systems and other related management systems in the district
    - Description of working and organizational processes and activities of operational and administrative units of the district, and how they communicate and interact with different areas of health, safety and environment (HSE)
    - Investigation of active contractor companies in the district, and their field of activity as well as criticality of their activities from HSE perspective
    - Development of documentations and system design (executive methods, guidelines, forms)
    - Training specialized working groups such as training basics and requirements of Health, Safety, and Environment Management System (HSE-MS) for members of the leadership committee and managers of the district (3 hours), training the basics and requirements, documentation and implementation of Health, Safety and Environmental Management System (HSE-MS) for all working groups (16 hours), training identification of hazards and assessment of health, safety and environmental risks for working group of hazard identification and risk assessment (16 hours), training internal audit of HSE management system for internal audit working group (12 hours), general training of health, safety and environment concepts for all personnel (4 hours), training leadership of established HSE management system for working group of implementation and execution of system (16 hours) and, finally, registration of records of training courses based on the requirements of General Directorate of Organization and Training, and submitting it to HSE Management Secretariat
    - Holding HSE risk assessment meetings with organizational experts and related contractors and visiting working sites
    - Identification of HSE hazards and assessment of risks and providing required control strategies
    - Providing a list of legal requirements related to HSE
    - Determination of overall and partial goals of health, safety and environment based on the output of risk management process
    - Providing risk management plan and its aspects
    - Announcement of risk reduction measures to key personnel and monitoring their effectiveness
    - Identification of HSE critical jobs with regard to risk assessment results
    - Development of required qualifications document for critical and specialized HSE jobs
    - Provision and announcement of health, safety, and environment (HSE) policies



- Announcement of the plans and programs for realization of HSE objectives to relevant authorities
- Development of operational plan for implementation of each of the execution methods, holding meetings, providing required training and completing forms aiming to implement the documents in the district
- Performing or completing periodic examinations of employees
- Monitoring and measuring of harmful factors in the workplace, such as measuring quality parameters of drinking water in parks of the district, measuring gases and particles in the air in the environment, measuring environmental noise, and so forth.
- Implementation of internal audit
- Examination of non-conformities and recommendations for improvement and implementation of corrective and preventive measures, and finally,
- Conducting an audit by a foreign company and obtaining a certificate.

## **Research Method**

The method used in this research is documentary study, and field observation is descriptive-explanatory survey. The present study is cross-sectional in terms of time criterion, and is an extensive study in terms of depth criterion. The data has been collected using a questionnaire and (quantitative and qualitative) interviews. In library method, by referring to the libraries of different organizations such as Parks and Green Space Organization of Tehran Municipality, Environmental Protection Organization, Center for Statistics of Iran, Faculty of Environment of University of Tehran, Science and Research Unit of Islamic Azad University, and Tehran Municipality of District 13, as well as Internet searches with the subject of research, the required information have been collected from Persian and English sources. In field method, by referring to parks in the study area, through observing health, safety, and environmental conditions, taking photographs of the positive and negative factors affecting health, safety and environment conditions in the studied parks, and interviewing authorities and experts of parks and green spaces, the required information was gathered. The statistical population of this research consists of green space authorities of district 13 in its four area which have 34 parks, as well as citizens and visitors to the parks in this district.

The research questionnaire has been designed in two sections: a questionnaire for green space authorities and a questionnaire for opinions of citizens and visitors of the parks. In order for sampling from the statistical population, namely the urban parks located in the 4 areas of district 13 of Tehran, precise multi-stage sampling method has been used. In the first stage, among the parks of each area in the district, two parks have been selected, one with regional or district scale, and the other with neighborhood scale, and based on having significant facilities and large number of visitors to it; in the second stage, some of the parks selected in the first stage were selected based on general safety, health and environmental considerations and having special facilities at district area, and neighborhood scale as the study population of this research. It should be noted that due to the selection of samples with regard to the mentioned factors in each stage of the above method as well as dispersion of samples at the study area, the results of studying the samples can be generalized to the whole statistical population in urban parks of district 13.

35 questionnaires were distributed among green space authorities of the district and 400 questionnaires were distributed among citizens. According to Cochran formula, given the population of district 13 which is 303017 people, 384 is obtained; however, 16 other questionnaires were also added to them in order to prevent possible errors. It should be noted that sampling method is available simple random sampling method.

## **Research Results**

Results of the questionnaires showed that 187 (%46.8) of the sample size were male and 213 (%53.2) were female. According to these statistics, the highest frequency is related to females.

107 people (%26.8) in the sample go to park to exercise, 62 people (%15.5) go to park to participate in friends' gathering, rest and enjoy leisure time, 85 people (%21.2) go to park to use play facilities and equipment there, and 146 people (36.5%) go to park for walking.

✓ **Questionnaires related to citizens and parks visitors**

Among the citizens and parks visitors, 111 people (%27.8) usually go to park in the morning, 73 people (%18.2) go to the park before noon, 48 people (%12) at noon, and 168 people (42%) usually go to the park in the evening.

237 (%59.2) of the sample size believe that the park is located in a good place in the city and 155 people (%38.8) believe that the park is not located in a good place in the city.

27 people (%4.1) of the sample population believe that there is not enough warning and directional boards in this park; 65 people (%9.8) believe in shortage of drinking water, 82 people (%12.4) believe in shortage of children's play equipment while 34 people (%5.1) in shortage of chess table, 91 people (%13.8) in shortage of shady trees, 64 people (%9.7) in shortage of benches, 53 people (%8) in shortage of adult play equipment, 48 people (%7.3%) in shortage of trash bins, 37 people (%5.6) in shortage of toilets and washrooms, 26 people (%3.9%) in shortage of ping pong table and 79 people (%12) believe in shortage of lighting base in the park.

37 people (%7.8) believe that the park should have a buffet or restaurant; 59 people (%12.4) demand fountain, 41 people (%8.6) ask for ping pong table, 75 people (%15.8) demand adult play equipment, 66 people (%13.9) adult playground, 51 people (%10.8) chess table, 83 people (%17.5) bower, and 62 people (%13.1) believe that the park should be equipped with a library or culture house.

Regarding the questions related to safety variable, the following results have been obtained. The highest average is related to the question "What is your opinion about lighting status of the park for nighttime use?" which has gained an average score of 2.11, which means that citizens have rated the park's lighting status at night to be at a moderate level. The lowest average is related to the question "How is the park's status in terms of no bothering of bikers or motorcyclists?" with an average of 1.84 which means that citizens have evaluated the park's condition in terms of bothering of bikers or motorcyclists to be at a moderate level.

Regarding the questions related to safety variable, the following results have been obtained. The highest average is related to the question "Are the instructions for using sport facilities of the park installed on these equipment?" which has gained an average score of 2.53, which means that instructions for use of the park's sport facilities are installed on many facilities. The lowest average is related to the question "Have you ever observed any incident resulted from working with the park's sports equipment?" with an average of 1.6 which means that citizens have not observed any incident due to working with the park's sports equipment.

Regarding the questions related to health variable, the following results have been obtained. The highest average is related to the question "What is your opinion about cleanliness status of the park?" which has gained an average score of 2.41, which means that citizens have evaluated the cleanliness of the park to be at a good level, and the lowest average is related to the question "How is cleanliness and equipment of washrooms and toilets in the park?", with an average of 1.89 which means that citizens have evaluated cleanliness and equipment of washrooms and toilets in the park to be at a moderate level.

Regarding the question that "Whether the buffet or restaurant staff wear suitable hygienic clothing and use gloves?", 274 people (%68.5) of the sample size believe that the staff at the buffet or restaurant of the park wear suitable hygienic clothing and use gloves and 126 people (%31.5) believe that buffet or restaurant staff do not wear suitable hygienic clothing and do not use gloves.

In the case of questions related to the environment variable, the following results have been obtained. The highest average is related to the question "How is the status of waste collection in this park?" with an average of 2.46, which means that waste collection status in the park is good; and the lowest average is related to the question "What is your opinion about the status of vegetation maintenance and processing in this park?" with an average of 2.25, which means that the status of vegetation maintenance and processing in the park is at a moderate level.

Regarding the question “Do citizens and park visitors see spraying operations?” 226 people (%43.5%) of the sample size have seen spraying operations when they have been in the park and 174 people (%56.5) have not seen spraying operations when they have been in the park.

Among the citizens and park visitors, 269 people (%67.2) of the sample size have received needed warnings about spraying operations, and 131 people (%32.8) have not received needed warnings about spraying operations

Regarding information about the dangers of pesticides used in spraying operations, 213 people (%53.2) of the sample size were aware of the dangers of toxins used in this operation, and 187 people (%46.8) are not aware of the dangers of toxins used in this operation.

Regarding the noise in the parks, 158 people (%39.5) of the sample size consider the noise in the park to be annoying and 239 people (%59.8) consider the noise in the park not to be annoying.

In the case of certain types of pollutions in the park, 117 people (%29.2) have observed a specific type of pollution in the park and 283 people (%70.8) have not observed any specific type of pollution in the park.

Regarding the types of pollutions in the park, 25 people (%21.4) have mentioned noise pollution, 30 people (%25.6) water pollution, 13 people (%11.1) air pollution, 8 people (%6.8) soil pollution, and 41 people (35%) have mentioned bad smell in the park.

✓ **Questionnaires related to the authorities of parks and green spaces in district 13 of Tehran**

The authorities of parks and green spaces of district 13 have answered the questions related to “How is the health status from the viewpoint of authorities?” as below. The highest average is related to the question “Does the park’s staff room have a good health status in terms of light, ventilation, equipment and lack of moisture and pollution?” with an average of 2.71, which means that the status of park staff in terms of light, ventilation, equipment and lack of humidity and contamination is appropriate; and the lowest average is related to the question “Do the staff use masks, gloves and other sanitary equipment when cleaning the park?” with an average of 1.85, which means that the staff use masks, gloves and other sanitary equipment to some extent when cleaning the park.

Regarding the questions related to “How is health variable from the viewpoint of authorities?”, the highest average is related to the question “Is drinking water in the park tested annually in terms of being suitable for drinking and not having microbial contamination?” as well as the question “Does the buffet have a license?” with an average of 2, which means that drinking water in the park is tested annually in terms of being suitable for drinking and not having microbial contamination, and the buffet has a license. The lowest average is related to the question “Whether supplying and serving healthy food is done in some parks in the district?” with an average of 1.77, which means that supplying and serving healthy food is done in some of the parks in the district.

Regarding good locating of children’s playground, 10 people (%28.6) of the sample size believe that children’s playground is not located in a good place, and 13 people (%37.1) believe that children’s playground is somewhat in an appropriate place and 12 people (%34.3) believe that children’s playground is in the right place.

Regarding safety of children’s playground, 5 people (%14.2) of the sample believe that children’s playground in the park is not safe; 11 people (%31.4) believe that children’s playground in the park is safe to some extent, and 18 people (%51.4) believe that children’s playground in the park is safe.

Regarding the reason for lack of safety of children’s playground, 2 people (%12.5) of the sample mentioned possibility of collision with play equipment, 4 people (%25) mentioned existence of dangerous roughness in the playground, 1 person (%6.2) mentioned inappropriate materials of the playground, 2 people (%12.5) mentioned existence of unnecessary objects in the playground, 3 people (%18.8) mentioned the lack of enough light to use the playground at night, and 4 people (%25) mentioned the lack of suitable vegetation around the playground as the reasons for the lack of safety of children’s playground.

Regarding safety of adults' playground or amusement park, 3 people (%8.6) of the sample size believe that adults' playgrounds or amusement park is not safe, 9 people (%25.7) believe that adults' playground or amusement park is somewhat safe and 23 people (%65.7) believe that adults' playground or amusement park is safe.

Regarding the reasons for lack of safety of adults' playground or amusement park, 4 people (%33.3) of the sample size mentioned existence of unnecessary objects in the playground, 3 people (%25) mentioned land exposure to intense sunlight, 2 people (%16.7) mentioned possibility of collision of playing equipment with people, 1 person (%8.3) mentioned the lack of proper drainage around the playground, and 2 people (%16.7) mentioned the lack of restoration and maintenance of floor surfaces as the reasons for lack of safety of adults' playground or amusement park.

Regarding safety of play equipment of children and adults in the park, 6 people (%17.1) believe that play equipment of children and adults in the park are not safe, 7 people (%20) believe that play equipment of children and adults in the park are somewhat safe, and 22 people (%62.9) believe that play equipment of children and adults in the park are safe.

Regarding the reasons for the lack of safety of play equipment of children and adults in the park, 1 person (%7.7) mentioned the lack of suitable materials, 2 people (%15.4) mentioned sharp edges and additional excrescences, 1 person (%7.7) mentioned equipment breakdown and lack of strong connectors between their components, 5 people (%38.5) mentioned non-standard design of play equipment based on age, fitness, and the distances between connectors of equipment components, and 4 people (%30.8) mentioned the lack of side shields as the reasons for lack of safety.

Regarding safety of the park's public equipment (fountains, tables, benches, and drinking water), 2 people (%5.7) of the sample size believe that public equipment of the park is not safe, 14 people (%40) believe that the park's public equipment is somewhat safe and 19 people (%54.3) believe that the park's public equipment is safe.

Regarding the reason for lack of safety of the park's public equipment, 3 people (%18.8) mentioned the lack of proper lighting for the equipment, 1 person (%6.2) mentioned the existence of power cord or lamp in the fountain without safe control, 4 people (25%) mentioned poor design of the place and drinking faucets, 2 people (%12.5) mentioned extra excrescence and sharp edges, and 6 people (%37.5) mentioned existence of tables and benches with non-standard structure and size disproportionate to peoples' ergonomics as the reasons for the lack of safety of the park's public equipment.

Regarding existence of movement obstacles in main and secondary routes of parks, 16 people (%40) believe that there are no obstacles in the main and secondary routes and recreational areas of the park, and 21 people (%60) believe that there are obstacles in the main and secondary routes and recreational areas of the park.

Regarding the reason for existence of obstacles in the main and secondary routes and recreational areas of parks, 2 people (%9.1) of the sample size mentioned the existence of cavity or open well in the main and secondary routes and recreational areas of the park, 6 people (%27.3) mentioned unfinished construction operations, 2 people (%9.1) mentioned many stairs, 3 people (%13.6) mentioned existence of extra objects, 4 people (%18.2) mentioned metal bars or chains at the entrance of the park, 2 people (%9.1) mentioned poor establishment of the public equipment and 3 people (%13.6) mentioned inappropriate flooring of the entrance to the park as the movement obstacles in the park.

Regarding the viewpoint of authorities of parks and green spaces of district 13 about appropriate distance of plants from park passageways, 16 people (%45.7) of the sample believe that proper distance of plants from park passageways has not been observed and 19 people (%54.3) believe that proper distance of plants from park passageways has been observed.

Regarding appropriate and standard width of main park paths, 7 people (%20) believe that width of the main paths of parks is not suitable and standard, 10 people (%28.6) believe that width of the main paths of parks is

somewhat suitable and standard, and 18 people (%51.4) believe that width of the main paths of parks is suitable and standard.

Regarding the reasons for width of the main paths of parks not being suitable and standard, 4 people (%23.5) believe that width of the main routes is not suitable for movement of relief emergency cars and other needed vehicles, 2 people (%11.8) believe that width of the main routes is not suitable for movement of wheelchairs, and 11 people (%64.7) believe that width of the main routes is not suitable for movement of relief emergency cars and other needed vehicles and movement of wheelchairs.

Regarding safety of flooring of park routes in various seasons of the year, 4 people (%11.4) believe that the width of the main routes of the park is not suitable and standard, 8 people (%22.9) believe that width of the main routes of the park is somewhat appropriate and standard and 23 people (%65.7) believe that width of the main routes of the park are suitable and standard.

Regarding the reasons for lack of safety of flooring surfaces of the park routes in different seasons, 5 people (%41.7) mentioned inappropriate floor materials, 3 people (%25) mentioned the lack of restoration and maintenance, and 4 people (%33.3) mentioned non-complete construction operations as the reasons for lack of safety of flooring surfaces of the park routes in different seasons of the year.

Regarding appropriate lighting of the park's recreational routes and areas for nighttime use, 10 people (%28.6) believe that the park's recreational routes and areas do not have suitable lighting for nighttime, 8 people (%22.9) believe that the park's recreational routes and areas have somewhat suitable lighting for nighttime use, and 17 people (%48.6) believe that the park's recreational routes and areas have suitable lighting for nighttime use.

Regarding the reasons for inappropriate lighting of the parks' routes and areas for nighttime use, 6 people (%33.3) mentioned small number of short and long lighting bases, 5 people (%27.8) mentioned inadequate place of lighting bases, and 7 people (%38.9) mentioned existence of out of service lights and burned or dimmed bulbs as the reasons for inappropriate lighting of the parks' recreational routes and areas for nighttime use.

Regarding safety of the park's lighting and electrical equipment, 3 people (%8.6) of the sample believe that the park's lighting and electrical equipment is not safe, 8 people (%22.9) believe that the park's lighting and electrical equipment is somewhat safe and 24 people (%68.6) believe that the park's lighting and electrical equipment is safe.

Regarding the reasons for lack of safety of the park's lighting and electrical equipment, 1 person (%9.1) of the sample size mentioned open door of electrical control panels or lighting units, 3 people (%27.3) mentioned lack of labels showing the risk of electric shock, 2 people (%18.2) mentioned lack of insulating covers, 4 people (%36.4) mentioned placement of the equipment in inappropriate and accessible places, and 1 person (%9.1) mentioned existence of power cord without safety considerations as the reasons for lack of safety of the park's lighting and electrical equipment.

Regarding existence of warning and directional panels in parks, 7 people (%20) believe that there is no warning and directional panels in parks, and 28 people (%80) believe that there are warning and directional panels in parks.

Regarding visibility of the existing panels in the park at day and night, 5 people (%14.3) believe that warning and directional panels in the park cannot be well seen at day and night, and 19 people (%54.3) believe that warning and directional panels existing in the park can be well seen at day and night.

Regarding notices to visitors at the times of spraying operations, 2 people (%5.7) believe that at the times of spraying operations, the required notices and warnings are not given to the park visitors, 5 people (%14.3) believe that the required notices and warnings are somewhat given to the park visitors, and 28 people (%80) believe that at the times of spraying operations, the required notices and warnings are given to the park visitors.

Regarding availability of relief facilities in parks, 11 people (%31.4) believe that there is a public telephone in the park or near it, 9 people (%25.7) mentioned fire extinguishers, 7 people (%20) mentioned first aid boxes, and 8 people (%22.9) believe that there is a firefighting valve in the park or near it.

Regarding gathering of unfit social groups or addicts, 31 people (%88.6) believe that the park is not usually the site of gathering of unfit social groups or addicts, and 4 people (%11.4) believe that the park is somewhat the site of gathering of unfit social groups or addicts.

Regarding constant controlling of the park by the guards, 6 people (%17.1) believe that the park is not under constant control of the guards, and 29 people (%82.9) believe that the park is under constant control of the guards.

Regarding equipment of guards with defensive devices, 9 people (%25.7) believe that guards are not equipped with defensive devices, and 26 people (%74.3) believe that guards are equipped with defensive devices.

Regarding periodic monitoring of the parks' public equipment and play equipment for children and adults, 1 person (%2.9) believes that the parks' public equipment and play equipment for children and adults are not periodically monitored and recovered, and 28 people (%80) believe that the parks' public equipment and play equipment for children and adults are periodically monitored and recovered.

Regarding the parks' being equipped with medical emergency services, 5 people (%14.3) believe that parks (on an area scale) are not equipped with medical emergency facility, 23 people (%65.7) believe that parks (on an area scale) are somewhat equipped with medical emergency facility, and 7 people (%20) believe that parks (on an area scale) are equipped with medical emergency facility.

Regarding the source or sources of water for irrigation of green spaces in the park, 29 people (%82.9) mentioned well water, 1 person (%2.9) mentioned aqueduct water, 2 people (%5.7) mentioned tanker water and 3 people (%8.6) mentioned urban wastewater or sewage as the source of water for irrigation of green spaces in the park.

Regarding measurement of the quality of water resources for irrigation of parks' green space, 10 people (%28.6) believe that the quality of water resources for irrigation of green spaces in the park has not been measured yet and 25 people (%71.4) believe that the quality of water resources for irrigation of green spaces in the park has been measured so far.

Regarding maintenance, processing and improvement of vegetation situation in parks, 12 people (%43.3) of the sample size believe that maintenance, processing and improvement of vegetation situation in parks are not done well and 23 people (%56.7) believe that maintenance, processing and improvement of vegetation situation in parks are done well.

Regarding the methods to remove plant pests and diseases in parks, 9 people (%25.7) mentioned mechanical method, 7 people (%20) mentioned biological method, 13 people (%37.1) mentioned chemical method and 6 people (%17.1) mentioned mechanical method as the methods for removing plant pests and diseases in parks.

Regarding the type of fertilizers used in parks, 2 people (%5.7) mentioned organic fertilizers, 1 person (%2.9) mentioned mineral fertilizers and 32 people (%91.4) mentioned both types of fertilizers.

Regarding the existence or non-existence of allergenic, toxic and spiny plant species along the routes or playgrounds, all people believe that allergenic, toxic and spiny plant species have not been planted along the routes or playgrounds.

Regarding observance of safety, health and environmental considerations in the use of pesticides and chemical fertilizers, 4 people (%11.4) mentioned the use of proper clothing and personal protection equipment by park staff, 3 people (%8.6) mentioned individual health cares, 6 people (%17.1) mentioned spraying under favorable climatic conditions, 5 people (%14.3) mentioned doing the operations during quiet hours (at night time), 7 people (%20) mentioned care in order to prevent contamination of the existing food and available sources of drinking, 1 person (%2.9) mentioned correct disposal of the remained cans and materials and washing of the working instruments, 2 people (%5.7) mentioned care for not polluting the environment and the resources for irrigation of green spaces, 4 people (%11.4) mentioned proper transportation and

maintenance of pesticides and chemical fertilizers in storage, 2 people (%5.7) mentioned usage of special warehouses for storage of chemical pesticides and 1 person (%2.9) mentioned installation of MSDS (Material Safety Data Sheet) at the place of storing the toxins.

Regarding human sewage disposal system in parks, 29 people (%82.9) mentioned absorbent well and 6 people (%17.1) mentioned septic tank as the human sewage disposal systems.

Regarding the question that “Do some parks create pollutions for the surrounding areas?” 26 people (%74.3) responded no, 7 people (%20) responded somehow, and 2 people (%5.7) responded yes.

Regarding air pollutants around or inside parks, 13 people (%37.1) mentioned motor vehicles, 7 people (%20) mentioned factories, 11 people (%31.4) mentioned construction operations and 4 people (%11.4) mentioned buffets as the causes of air pollution around or inside parks.

Regarding visible impact of air pollution on parks’ environment, 7 people (%20) of the sample people believe that air pollution has no visible impact on the parks’ environment, and 28 people (%80) believe that air pollution has a visible impact on the parks’ environment.

Regarding sources of noise pollution around or inside parks, 13 people (%37.1) mentioned vehicles traffic, 6 people (%17.1) mentioned factories, 8 people (%22.9) mentioned cyclists or motorcyclists’ traffic, 5 people (%14.3) mentioned construction operations and 3 people (%8.6) mentioned the noise caused by children’s playgrounds as the causes of noise pollution around or inside parks.

Regarding existence of waste separation trash bins in parks, 3 people (%8.6) believe that there are no waste separation bins in parks, and 32 people (%91.4) believe that there are waste separation bins in parks.

#### **Examination of the research hypotheses**

First, using Kolmogorov-Smirnov test, normal distribution of the research variables was examined. Then, using statistical tests, the research questions were analyzed and with the help of single sample t test, the status of each of the variables was examined.

##### **✓ The first hypothesis**

*It seems that from the viewpoint of citizens, safety conditions and principles governing the parks and green spaces of the district are in accordance with requirements and principles of standards.*

The test statistic for the variable of safety conditions and principles is equal to 21.798. The mean of the variable of safety conditions and principles is equal to 3.80. T test has been used to test this. T value in the table is equal to 1.646. Given that the obtained t value is higher than the t in the table, with 95% confidence, it can be said that from the viewpoint of citizens, safety conditions and principles governing parks and green spaces of the district are in accordance with requirements and principles of standards.

**Table 1: T test for the first hypothesis**

Mean	T statistic	Degree of freedom	Mean difference	T value of the table	95% confidence distance	
					Top limit	Bottom limit
3.80	21.798	399	0.804	1.646	0.876	0.731

##### **✓ The second hypothesis**

*It seems that from the viewpoint of citizens, health conditions and principles governing the parks and green spaces of the district are in accordance with requirements and principles of standards.*

The test statistic for the variable of health conditions and principles is equal to 6.140. The mean of the variable of health conditions and principles is equal to 3.33. T test has been used to test this. T value in the table is equal to 1.646. Given that the obtained t value is higher than the t in the table, with 95% confidence, it can be said that from the viewpoint of citizens, health conditions and principles governing parks and green spaces of the district are in accordance with requirements and principles of standards.

**Table 2:** T test for the second hypothesis

Mean	T statistic	Degree of freedom	Mean difference	T value of the table	95% confidence distance	
					Top limit	Bottom limit
3.33	6.140	399	0.336	1.646	0.444	0.228

✓ **The third hypothesis**

*It seems that from the viewpoint of citizens, environmental conditions and principles governing the parks and green spaces of the district are in accordance with requirements and principles of standards.*

The test statistic of the variable of environmental conditions and principles is equal to 4.976. The mean of the variable of environmental conditions and principles is equal to 3.21. T test has been used to test this. T value in the table is equal to 1.646. Given that the obtained t value is higher than the t in the table, with 95% confidence, it can be said that from the viewpoint of citizens, environmental conditions and principles governing parks and green spaces of the district are in accordance with requirements and principles of standards.

**Table 3:** T test for the third hypothesis

Mean	T statistic	Degree of freedom	Mean difference	T value of the table	95% confidence distance	
					Top limit	Bottom limit
3.21	4.976	399	0.211	1.646	0.295	0.128

✓ **The fourth hypothesis**

*It seems that from the viewpoint of authorities, safety conditions and principles governing the parks and green spaces of the district are in accordance with requirements and principles of standards.*

The test statistic for the variable of safety conditions and principles is equal to 2.505. The mean for the variable of safety conditions and principles is equal to 3.44. T test has been used to test this. T value in the table is equal to 1.646. Given that the obtained t value is higher than the t in the table, with 95% confidence it, can be said that from the viewpoint of authorities, safety conditions and principles governing parks and green spaces of the district are in accordance with requirements and principles of standards.

**Table 4:** T test for the fourth hypothesis

Mean	T statistic	Degree of freedom	Mean difference	T value of the table	95% confidence distance	
					Top limit	Bottom limit
3.44	2.505	34	0.447	1.646	0.810	0.084

✓ **The fifth hypothesis**

*It seems that from the viewpoint of authorities, health conditions and principles governing the parks and green spaces of the district are in accordance with requirements and principles of standards.*

The test statistic for the variable of health conditions and principles is equal to 3.848. The mean for the variable of health conditions and principles is equal to 3.89. T test has been used to test this. T value in the table is equal to 1.646. Given that the obtained t value is higher than the t in the table, with 95% confidence, it can be said that from the viewpoint of authorities, health conditions and principles governing parks and green spaces of the district are in accordance with requirements and principles of standards.

**Table 5:** T test for the fifth hypothesis

Mean	T statistic	Degree of freedom	Mean difference	T value of the table	95% confidence distance	
					Top limit	Bottom limit
3.89	3.848	34	0.895	1.646	1.368	0.422



✓ **The sixth hypothesis**

*It seems that from the viewpoint of authorities, environmental conditions and principles governing the parks and green spaces of the district are in accordance with requirements and principles of standards.*

The test statistic for the variable of environmental conditions and principles is equal to 4.461. The mean for the variable of environmental conditions and principles is equal to 3.80. T test has been used to test this. T value in the table is equal to 1.646. Given that the obtained t value is higher than the t in the table, with 95% confidence, it can be said that from the viewpoint of authorities, environmental conditions and principles governing parks and green spaces of the district are in accordance with requirements and principles of standards.

**Table 6:** T test for the sixth hypothesis

Mean	T statistic	Degree of freedom	Mean difference	T value of the table	95% confidence distance	
					Top limit	Bottom limit
3.75	4.461	34	0.752	1.646	1.095	0.409

**Discussion and Conclusion**

In recent years, Health, Safety and Environment (HSE) Management System has been proposed as a powerful and comprehensive management tool but has been mostly used in development plans and industrial projects. On the other hand, implementation of these standards is no longer a choice but a compulsion. In Iran also, despite all the shortcomings, implementation of these standards is increasing. Given that this system, by simultaneously examining three factors of health, safety and environment, provides a suitable ground for establishment and implementation of environmental management standards and health and safety standards, and by an integrated approach, provides a sustainable ground for development, it can be one of best management systems for managing parks and green spaces. The results of the research indicated that health, safety, and environment conditions and principles in parks and green spaces of district 13 are in accordance with health, safety, and environment conditions and principles, and all the proposed hypotheses were approved and the basic questions were answered and finally, some strategies and recommendations are provided regarding the management system of parks and green spaces.

**Strategies and recommendations**

Strategies in order to create sustainable green space:

1. Studying ecological conditions, soil and climate of the region;
2. Preventing planting of species requiring continuous and high irrigation;
3. Selection of native species adjusted to the existing conditions;
4. Application and creation of structures which are as robust as possible against the existing conditions and consistent with the surrounding structures;
5. Use of rainwater and runoff water extraction method in order to solve water deficit problem and no need for irrigation;
6. Use of beautiful and at the same time, environmentally friendly plant species;
7. Active protection (preservation and revitalization and performance improvement) of the existing gardens;
8. Preservation (revitalization and performance improvement) of the existing farming lands;
9. Maintaining connection of gardens in order to increase their environmental performance;
10. Improving visual qualities;
11. Emphasis on extensive promenades in regional and trans-regional scale;
12. Increasing participatory power;
13. Organizing physical and spatial system in order to enhance physical and performance quality;

14. Organizing movement and access system;
15. Organizing social and economic conditions.

In order to preserve and maintain green identity of the complex, it is necessary to organize and upgrade the quality of the existing garden routes, and these basics only belong to the pedestrians' movement.

In order to preserve and maintain gardens, connecting them to each other as well as observing the rights of the owners of gardens, and implementation of the plan for replaced lands of gardens as 30% and 70% is recommended. Owners can give their lands to the municipality and use the benefits of receiving an alternative land in the area.

In the area of active protection of gardens, profitable activities compatible with gardens are:

1. Urban campuses;
2. Health campuses;
3. Cultural-educational campuses;
4. Sports and recreation campuses.

#### **Recommendations for moving toward a greener city:**

1. Appropriate management and leadership at the metropolitan level;
2. A comprehensive approach to city and its environmental issues;
3. Urban wealth and income are important, but in the primary steps of development, adopting right policies will be more important;
4. Citizen participation;
5. Use of appropriate technology;
6. Green and brown lands should be seen together and work together;
7. Confronting unofficial settlements.

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