

## Assessment of Females' High Schools in District One of Tehran Based on the Sustainable School Indicators

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### ABSTRACT:

The data of this study was collected from 252 teachers, principals and vice-principals of females' high schools in district one through one researcher-administered questionnaire, and was then analyzed. The validity of the questionnaire was approved by seven university professors. Cronbach's alpha was used in order to measure the reliability of the questionnaire. The total calculated alpha was 0.81, and it was 0.79 for the component of using sustainable resources, 0.71 for the component of using healthy food, 0.79 for the component of school's distance from toxic substances available around it, and 0.72 for the component of using green education method. One-sample t-test showed that all of the four components are below the average in the study sample. The results from Friedman test in assessment of sustainable school indicators revealed that the four components had different rankings which should be considered by the principals in terms of importance. This ranking was as follows: school's distance from toxic substances available around it with the mean of 1.26 is in the first rank, using green education method with the mean of 2.30 in the second rank, using sustainable resources with mean of 2.76 is ranked third, and finally, using healthy food with the mean of 3.68 is ranked fourth in terms of importance. The study concluded that the measures taken with respect to sustainable schools' standards were not sufficient and further measures have to be taken in order to achieve these indicators.

**Keywords:** Sustainable schools, Sustainable resources, Healthy food, Toxic substances, Green education

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### INTRODUCTION

Given the fact that nonrenewable energy resources are running out and the damage to the environment caused by using such resources, many countries have turned to use renewable resources and sustainable development more than ever. According to Iran Energy Efficiency Organization, energy consumption in Iran is more than five times the average growth rate of

world's energy consumption. Therefore, there is no doubt that optimizing energy consumption can greatly help Iran's growth and development. In the meantime, attitude towards green architecture and sustainable spaces in educational environments including school has a special status, because, in addition to compliance with basic features of green buildings and saving

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energy, existence of such schools can be considered and studied as an educational tool for teaching sustainable practices to students (Safari and Mahmoodi, 2011).

There has been no special exclusive activity for decreasing carbon emission in Iran except for activities that have been done in construction of public green spaces, which were multi-purpose. However, some of Iran's cities including Tehran have been known to be among the most polluted cities of the world (Rayman, 2013). This fact can at least emphasize the need for paying attention to establishment of nature-friendly environments in the country. Some schools and other organizations have had sporadic activities in recent years in this respect, but unfortunately they could not have a crucial role in resolving environmental problems and air pollution. Green (sustainable) schools, with clear goals to become self-sufficient in energy production, recycling of materials and exploitation of renewable energies, can be studied and considered as generalizable model in other sections of the community including state administrative bodies, hospitals, etc., which will eventually have a great impact on cleansing the city. Given the existence of rich biological resources in Iran and government's policies in support of nature-friendly plans with the goal of decreasing environmental pollution and optimizing energy consumption as well as given the country's potential in terms of specialist human resources and on the one hand, limitation of environmental natural resources, the need for conducting basic, applied and development researches in relation to development of nature-friendly technologies and construction of nature-friendly (green) schools and universities for resolving fundamental problems related to environment and natural resources in consistency with country's 20-year outlook is felt (Malakooti Khah, 2012).

#### Literature Review Sustainable Schools

There is no comprehensive definition in relation to sustainable schools, which is agreed on by all the experts and its indicators or indices are not also approved of, so it is tried to eventually consider and cite the definition which incorporates most indicators and indices, in addition to pointing out to various viewpoints in this regard.

It has to be mentioned that some of the experts consider sustainable schools to be equivalent to green schools and/or environmental schools or eco schools; their opinions will be considered to better sum up the discussion. As it is mentioned in the statement made in Bonn in 2009, there are different instances and experiences for using educational approaches for sustainable development around the world. One of the experiences in using approach of school as a whole is sustainable school which tries to prepare the youth and young adults for a sustainable life through education and daily activities in such a way they can:

- ✓ Take care of themselves (their welfare and health);
- ✓ Take care of others (cultures and generations);
- ✓ Take care of their (local and global) earth.

Thus, it can be said that sustainable school gives importance to students' welfare and school's environment, so that it is a place for learning and students develop the concept of self in it and achieve high standards of success, in such a way the following cases are evident:

- ✓ There is less wastes and discardable material, there is recycling, and the garbage are turned into compost.
- ✓ The school supports local producers.
- ✓ Rainwater is collected from school's ground surface and is used.
- ✓ The approach of painting on the wall and playing is tried (Karimi and Enayati, 2012).

According to Bahrami (2013), the exclusive agent for International Foundation for Environmental Education in Iran whose activities is focused on supporting environmental schools and has many agencies in many countries of the world including Iran, has classified the parameters for its approved schools in 11 clauses and indices or indicators including: water, energy, waste material, garbage, biodiversity, transportation, healthy food, school yard, climate changes, preserving our world (global dimensions), and global citizen.

By reviewing the related literature and according to what was mentioned, sustainable schools are introduced with different dimensions and components. Although there are commonalities in some of these definitions, it

seems that given the comprehensiveness of the Karliner's model and adaptability of the components and its indices to schools in Iran, it is more appropriate to prepare the questionnaire, collect data and finally assess the girls' high schools in district one of Tehran based on this definition according to sustainable school indicators. In this model, the sustainable schools are those schools which follow four general categories of using sustainable resources, removing toxic substance, using healthy food and using green education and proceed to put it into practice (Karliner, 2013).

#### **Sustainable Resources**

The earth and its ecosystem has many resources. Some of the resources including soil and forest are renewable, i.e. they can be recreated, but some resources such as iron and oil are nonrenewable, i.e. if they are consumed, they cannot be regained. Both kinds of resources have limitations (Palmer, 2003).

It is energy which allows people to utilize renewable and nonrenewable resources of the ecosystems, turn them into different commodities and consume them, and finally, return them to ecosystem as wastes. More resources with higher polluting effect will have more consequences. However, the considerable point is that even by utilizing the cleanest energy sources, as the consumption increases, the environmental consequences will increase as well.

Leopold, the father of wildlife conservation says, we make use of land without consideration because we regard it as a commodity which belongs to us. When we see land as a community and believe that we belong to it, we will begin to use it with love and respect (Moharam Nezhad et al., 2006).

The most important alarm provoked about the impact of human's damages to the environment is the pollution of air, earth, rivers and seas by hazardous and deadly substances. This pollution is irreversible in many cases. The series of harms caused by this, not only linger on in the world which should nurture life in itself, but also in the bodies of living things in an irreversible manner (Carson, 1988).

The scope of environmental issues varies from local and small impacts such as the impact of the sound of a manufacturing plant on nearby

residents to global impacts such as carbon dioxide emission in various industries which eventually results in earth's temperature changes. Environment management is based on earth's capacity limitation with respect to supplying various resources for human use as well as the lack of enough space and capacity to dispose of wastes and garbage. Thus, the environment management can be defined as a process through which any organization assesses the major impacts of its activities on environment by determining the kind of its relationship with the environment, and tries to minimize the undesirable environmental impacts (Tahmourian, 2007). For example, the garbage are collected in order to clean up the environment, but when they are burned, the air gets polluted and/or when they are thrown in the river, the river gets polluted. There have been no technology known to completely remove pollution (Boroumand, 1991).

#### **Healthy Food**

There is not only one solution to the tangled problems of world's food. A global plan for food should encompass a combination of population stabilization efforts, growing more food as well as allowing poor people to have more access to food and food production (Miller, 2005).

A food system is needed in order to access healthy food; food system means an all-out look at food from the moment of planting, how it grows, harvesting, processing, packaging, storing, marketing, purchasing, and finally, consuming or eating it. If there is not comprehensive and integrated care in this system, the system may risk our environment. The food and agriculture system is the major water consumer and can highly damage our planet and even the world due to greenhouse gas emissions and eventually, endanger every plant's and creature's life (Sheikh al Eslam, 2013).

The world's population is going to be 9 billion in 2050, and if everyone is going to eat food, food production should be greatly increased. Achieving this goal is not possible without keeping the environment unharmed and the farmers being fairly rewarded for their efforts provided that we make some changes in the food system in order to improve the conditions. We need new methods and technologies in all sections of food production

chain. Food suppliers and people need to be taught how to make the right choice and they should be informed that what effects their choice would have on farmers and environment. Each one of us is able to help to make changes in the country's food system; it is possible to make a major change by choosing and consuming nutritious foods and reducing food waste, and contribute to the food system stabilization (Sheikh al Eslam, 2013).

#### **Removing Toxic Substances and Pollutants**

Pollution can be defined as an undesirable change in physical, chemical and biological properties of air, water or earth, which endangers health, survival and activities of human being and/or other living things. Based on this definition, pollution is not essentially physical damage. Interruption in man's activities is also considered pollution. It can be concluded that pollution is resulted from population increase, but population increase is not the only cause of pollution. Pollution is caused when people use energy sources and materials; pollution also depends on any individual's amount of use of different resources, but the situation is even more complicated. Using some kind of resources results in more pollution than using other resources. For example, manufacturing an aluminum can which is made in order to be disposed of after consuming its content, wastes more resources and causes more pollution than manufacturing a can which reused after consuming its content (Miller, 1998). Major pollutions in the nature are air pollution, water pollution and soil pollution.

Furthermore, environmental pollutions are divided into two groups of qualitative and quantitative pollutions. If the concerned element which caused the pollution exists in the nature and if it is intensified by some of the natural activities or human activities, the pollution is of quantitative kind. It is obvious example is the presence of carbon dioxide in the air, which has increased due to overuse of fossil fuels and will cause greenhouse effect. If the pollution has human origin, it is qualitative, such as pesticides and petrochemical and petroleum products (Saberi Sahneh, 2011).

#### **Green Education**

Since achieving sustainable development in any country is related to general public awareness of that community, education can be very effective in this regard. Environmental education believes that human being can live in harmony with the nature and make informed decisions through which future generations are also taken into account. Paying attention to future generations is a goal which is present as a common objective both in sustainable development and environmental education (Abbaspour, 2006).

First goal of environmental education is to train active individuals aware of their environment and their responsibility to protect it. In order to achieve this goal, education should raise people's understanding of the interactions of physical, biological, social, economic and cultural aspects of environment as well as dependence and complex relationships of social-economic development and improvement of environment. Individuals and social groups should acquire a set of values and interests to the environment through education and gain the necessary motivation to actively participate in protection and improvement of the environment. In addition, individuals and societies should develop the necessary skills to detect and resolve the issues related to environment (Dadfar, 2012). Increasing people's sensitivity to the environment is only possible through pointing out adverse effects of environmental threats and destruction on people's mental and physical health as well as encouraging them to participate in environmental protection, and this itself requires education (Karimi, 2006).

The most important and most effective kind of environmental education is the school education. It is because school, as the main center for education, can gradually cover the greatest segment of population. School system has a direct impact on children and the youth and an indirect impact on the adults, and it needs to coordinate with the educational system and other related centers to have a full efficiency, to have a proper structure in line with its goals, and to make a wide contact with the nature and outside area of the class and school (Dadfar, 2012). The goal of environmental education is to develop

sensitivity, responsibility and commitment among individuals to incidents and physical, economic, biological, social and political changes and their impact on the earth's life (Lahijanian, 2011). The subject of environmental education and raising public awareness, especially in developing countries, may be considered a serious and effective solution for stopping the accelerated destruction of environment and the nature. If every one of the community members become aware of the

necessity of the environmental protection, long steps can be taken toward sustainable development (Palmer, 2003).

**Theoretical Framework**

The conceptual model of the study in figure 1 as well as a summary of the dimensions and components of the Karliner's model for assessing the sustainable schools in table 1 is presented.

**Table 1: Dimensions and components of Kaliner's model for assessing sustainable schools**

Components	Dimensions
Using clean energy	<b>The amount of using sustainable resources</b>
Using natural light	
Implementation of water management	
Waste management	
Introduction of an appropriate dietary	<b>The amount of using healthy foods</b>
teaching techniques for cooking healthy foods	
Informing students about healthy food and its impact on health	
Attempting to grow vegetables in the school garden in healthy ways	
Adopting policies in order to reduce air pollution by safe transportation such as bicycles	<b>The amount of school's distance from toxic substance available around it</b>
The use of toxic gadgets at school	
The use of harmful detergents	
School's distance from environmental pollutants	<b>Using the method of green education</b>
To acquaint students with the environment	
Familiarizing students with endangered species	
teaching to communicate with the world (globalization) and the social interaction to students	
Training green ambassadors in schools	

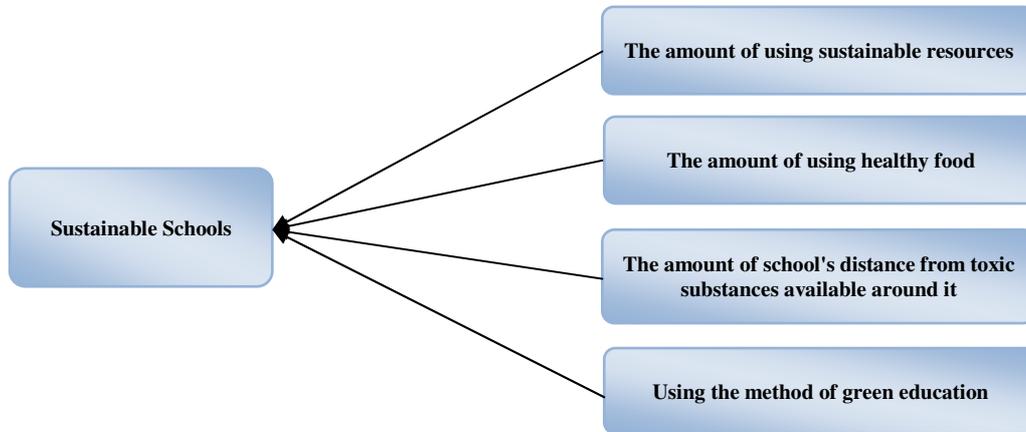


Figure 1: Conceptual model (Karliner, 2013)

Hence, given the theoretical framework as well as the conceptual model of the study, the researchers proposed the following main and sub-questions in order to fulfill the research objective:

#### Research Questions

1- To what extent do females' high schools in district one of Tehran utilize sustainable resources?

2- To what extent do females' high schools in district one of Tehran utilize healthy food?

3- To what extent do females' high schools in district one of Tehran remove pollutants and environmental toxic substances?

4- To what extent do females' high schools in district one of Tehran utilize methods of green education?

#### RESEARCH METHOD

The statistical population included all the teachers, principals and vice-principals of females' high schools in district one of Tehran including both state-run and non-state schools, which almost counted to 700 people (<http://tehranedu1.ir>). Krejcie and Morgan table was used in order to determine the sample size, based on which 252 people were selected as the sample of the study. Due to the vastitude of district one and the socio-cultural variety of the respondents, random cluster sampling was used

with respect to the population and sample size because the schools are scattered in district one of Tehran. The district one was divided into five zones of north, south, east, west and center and each one of these zones was considered a cluster, then in each cluster, a number of schools were randomly selected, and all the principals and vice-principals (complete enumeration) and a number of teachers from each school (randomly) were selected as the sample.

The data collection instrument in this study has been a researcher-made questionnaire which was designed based on 5-point Likert scale. The items of the questionnaire were allocated in the manner that totally, from the 51 questions, the amount of using sustainable resources included questions 1 to 13, the amount of using healthy food included questions 14 to 29, the amount of school's distance from toxic substance available around it and minimizing them included questions 30 to 39 and using method of green education included questions 40 to 51. In order to increase the validity of the questionnaire, face validity in a small-scale of 30 people of the statistical population as well as the content-related validity through comprehensively reviewing related literature and experts' judgment were used. Reliability of the questionnaire was measured using Cronbach's alpha as presented in table 2.

**Table 2: Cronbach's alpha of the questionnaire (reliability) and its four components**

Dimensions	Cronbach's alpha
The amount of using sustainable resources	0.79
The amount of using healthy food	0.71
The amount of school's distance from toxic substance available around it and minimizing them	0.79
Using the method of green education	0.72
Total	0.81

The data obtained from calculating Cronbach's alpha shows that the researcher-made questionnaire is confirmed in terms of reliability, so it can measure the dimensions and components. In order to describe the data, frequency distribution tables, percentage, cumulative percentage, and in inferential statistics, Kolmogorov-Smirnov test for determining the normality of the data, one-sample t-test and Friedman test for prioritizing sustainable school indicators were used and for this purpose, SPSS software was made use of.

**Findings**

In demographics section, descriptive findings revealed that 21.4 percent of the respondents belonged to the age group of 20 to 30 years old, 32.9 percent of the respondents to the age group of 31 to 40 years old, 34.1 percent of the respondents to the age group of 41 to 50 years old and 11.5 percent of them to the age group of above 50 years old. Besides, 79 percent of the respondents were married and 21 percent of them were single. In terms of their job status, 62.7 percent of the respondents were teacher, 14.7 percent of them vice-principal, 4.8 percent of them were principal and 17.9 percent of them had other jobs. Respondents' distribution in terms of years of service indicated that 16.7 percent of the respondents had lower than 5 years of experience, 22.6 percent of the respondents had 16 to 20 years of experience and 30.6 percent of them had over 20 years of experience. In terms of field of study, 46 percent of respondents majored in human sciences and 54 percent of them majored in fundamental

sciences. In the section of inferential statistics, Kolmogorov-Smirnov test was used to determine the normality of the data.

**RESULTS**

Question 1: To what extent do females' high schools in district one of Tehran utilize sustainable resources?

Based on the tables 3 and 4, the mean under study has been 1.325 and the mean difference is -2.674, and the value of t considered for this sample by taking into account the 60 percent weak, is 47 percent. While, the calculated value of t is -88.84. Since the mean obtained is below 4 and is significantly different from the theoretical mean, it can be concluded that the females' high schools' amount of using sustainable resources in district one of Tehran is below average.

Question 2: To what extent do females' high schools in district one of Tehran utilize healthy food?

Based on the tables 5 and 6, the mean under study has been 1.873 and the mean difference is -2.162, and the value of t considered for this sample by taking into account the 60 percent weak, is 47 percent. While, the calculated value of t is -57.874. Since the mean obtained is below 4 and is significantly different from the theoretical mean, it can be concluded that the females' high schools' amount of using healthy food in district one of Tehran is below average.

**Table 3: One-sample statistics of the amount of using sustainable resources**

Standard error	Standard deviation	mean	N	
0.030	0.477	1.325	252	The amount of using sustainable resources

**Table 4: One-sample t-test for the amount of using sustainable resources**

One-sample t-test (test value-3)						
Confidence interval		Mean difference	Two-tailed Significance level	Degree of freedom	Value of t	
upper	lower					
-2.615	-2.733	-2.674	0.000	251	-88.849	The amount of using sustainable resources

**Table 5: One-sample statistics of the amount of using healthy food**

Standard error	Standard deviation	Mean	N	
0.037	0.593	1.837	252	The amount of using healthy food

**Table 6: One-sample t-test for the amount of using healthy food**

One-sample t-test (test value-3)						
Confidence interval		Mean difference	Two-tailed Significance level	Degree of freedom	Value of t	
upper	lower					
-2.089	-2.236	-2.162	0.000	251	-57.874	The amount of using healthy food

Question 3: To what extent do females' high schools in district one of Tehran remove pollutants and environmental toxic substances?

Based on the tables 7 and 8, the mean under study has been 1.340 and the mean difference is -2.660, and the value of t considered for this sample by taking into account the 60 percent

weak, is 47 percent. While, the calculated value of t is -82.894. Since the mean obtained is below 4 and is significantly different from the theoretical mean, it can be concluded that the females' high schools' amount of removing pollutants and environmental toxic substances in district one of Tehran is below average.

**Table 7: One-sample statistics of the amount of removing pollutants and environmental toxic substances**

Standard error	Standard deviation	mean	N	
0.032	0.507	1.340	250	The removing pollutants and environmental toxic substances

**Table 8: One-sample t-test for the amount of removing pollutants and environmental toxic substances**

One-sample t-test (test value-3)						The amount of removing pollutants and environmental toxic substances
Confidence interval		Mean difference	Two-tailed Significance level	Degree of freedom	Value of t	
upper	lower					
-2.596	-2.723	-2.660	0.000	249	-82.894	

**Table 9: One-sample statistics of the amount of using methods of green education**

Standard error	Standard deviation	Mean	N	
0.035	0.556	1.710	252	the amount of using methods of green education

**Table 10: One-sample t-test for the amount of using methods of green education**

One-sample t-test (test value-3)						the amount of using methods of green education
Confidence interval		Mean difference	Two-tailed Significance level	Degree of freedom	Value of t	
upper	Lower					
-2.220	-2.358	-2.289	0.000	251	-65.264	

Question 4: To what extent do females' high schools in district one of Tehran utilize methods of green education? One-sample t-test results

Based on the tables 9 and 10, the mean under study has been 1.710 and the mean difference is -2.289, and the value of t considered for this sample by taking into account the 60 percent weak, is 47 percent. While, the calculated value of t is -65.264. Since the mean obtained is below 4 and is significantly different from the theoretical mean, it can be concluded that the females' high schools' amount of using methods of green education in district one of Tehran is below average.

Main question of the study: Do females' high schools in district one of Tehran follow sustainable schools indicators?

It can be concluded based on table 11 and Friedman test that in order to achieve an average level of criteria of establishing sustainable schools as a goal, it is essential that in terms of importance and need, for changing the current conditions in schools, first of all we pay special attention to removing toxic substances and pollutants from schools; secondly, we emphasize on methods of green education and environmental protection, and do more effective activities in this matter; and finally, using sustainable resources and healthy food also reach closer to the average level of standards. By considering these priorities, we can plan and implement the necessary programs in order to establish sustainable schools.

## DISCUSSION

In review of the sustainable school indicators and in comparison of schools in district one with these indicators and indices, as Karimi and Enayati (2012) had emphasized on the necessity of paying attention to sustainable schools in order to achieve the goal of sustainable development, the findings of the present study could reveal that major steps should be taken in this regard and the Education Department and educational centers in district one are still at the beginning of these steps.

In the present study there have been some correlation between different indicators of sustainable schools, in such a way that when green (sustainable) education is below average,

other indicators do not show a proper development as well, and indicators of distance from toxic substances, sustainable resources and using healthy food are also below average. This finding was confirmed in a separate study conducted by Mirdamadi et al. (2007) titled "A Study of High School Students' Degree of Awareness of Sustainable Schools' Importance in Tehran". They also figured out that there has been a significant relationship between independent variables of age, father's education, mother's education, using radio and TV programs and studying environmental articles and books and dependent variables of students' degree of environmental awareness. They also found that participating in activities related to environment affects students' degree of environmental awareness.

This study also showed that development of environmental awareness is not at an acceptable level in schools. Pour Ebrahim et al. (2000) in their study titled "Measuring the Degree of Industry Executives', Artists', Housewives', Teachers' and Businessmen's Awareness with Respect to Green (Sustainable) Social Entities in Ilam City and Studying Successful Methods of Environmental Education", found that the most important cause of environmental problems is people's ignorance and unawareness, and those involved in cultural activities are among the important groups affecting environmental education. This finding also supports the results of Pour Ebrahim et al. (2000) study.

In the present study, existence of appropriate green spaces and designing school construction has been studied and emphasized as one of the assessment factors of girls' high schools in district one in terms of sustainable school indicators. Prior to this, Goodfellow and Power (2008) in a project titled "Raising Standards: Making Sense of the Sustainable Schools Agenda", set out eight aspects of the work of a school which it termed 'sustainability themes' or 'doorways' in which action could be taken, and learning occur. These include food and drink, energy and water, travel and traffic, purchasing and waste, buildings and grounds, inclusion and participation, local well-being and the global dimension; they also assessed a number of schools in England with their criteria and found similar results.

**Table 11: Friedman test for prioritizing sustainable school indicators**

Mean rank	sustainable school indicators
2.76	Sustainable resources
3.68	Healthy food
1.26	Schools' distance from toxic substances
2.30	Methods of green education

## CONCLUSION

According to the findings of the study and the assessments made with respect to 4 sustainable school indicators, it can be concluded that the assessment of females' high schools in district one of Tehran is below average. In other words, none of the indicators were assessed to be above the average, although the degree that the assessment was below the expected level has been different and some of the indicators were far below the average and some of them were in somehow better status.

Regarding the distance from toxic substances and pollutants, the schools under study were far away from standards and a lot of effort must be made in this respect in order to achieve sustainable schools in Tehran. Main reasons of this indicator's drop include most schools' exposure to soot, nonstandard packaging of the foods, oil-based paintings and presence of vehicles which have high fuel consumption for students' transportation.

The next indicator which needs to be specially taken care of and it is still below average, is green education. The main cause of this problem lies in inattention to offering in-service training courses with the aim of environment for teachers, not including the necessary materials related to environmental protection for students, and finally, lack of rewarding systems and not informing in this regard in schools under study.

Although the third indicator, using sustainable resources in schools under study, is below average, it is in better status than two other indicators. In this district of the city, schools

use natural light to some extent, there are appropriate heating and cooling systems and there have been proper ways to stop wasting energy in classes, but of course, there is a long way to reach the desired standards.

The only indicator which is closer to the average and can reach the standard level has been using the healthy food. Students and teachers have avoided consuming harmful foods to some extent, have paid attention to proper nutrition and have considered the nutritional value of foods and vegetables; although the increase in this indicator could be expectable because the schools under study has been for girls and this district of the city has relatively higher standard of living. It should be considered that regarding this indicator, many schools lack adequate green or arable space and/or harmful foods to the health of young people are sold at the school's canteen, so they still need to be taken care of.

Altogether, it can be concluded the general level of the schools under study in district one is below the average and they need to be specially taken care of to achieve the goals desired by sustainable schools.

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