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CASE STUDY

Development of a strategic plan through SWOT analysis to control traffic-borne air pollutants using CALINE4 model

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ABSTRACT

Traffic is one of the main sources of air pollution in metropolitan areas. With development of transportation system, inappropriate vehicle production, and the use of low-quality fuels, increased pollution in these areas is inevitable. The current study tries to determine $PM_{2.5}$, PM_{10}, NO_2, and CO emission dispersion, caused by traffic, using CALINE4 software. According to research findings, during one month in each of 3 different seasons, CO levels varied between 30-55ppm. Also, NO_2 levels, at all stations in Tehran, varied between 0.1- 0.4ppm; values above 0.05 represent pollution by diesel-fueled vehicles, mostly old and outdated public transportation buses. Modeling of suspended particles smaller than 2.5 microns indicated that pollution at all of the 10 stations was between 65-113µg/m3, which was above standard (35µg/m^3). In addition, during all the studied months, the amount PM_{10} varied between 105-193µg/m^3, and in some areas, it was above the Standard of the Iranian Department of the Environment (DOE) of 150µg/m3. According to matrix of internal and external factors analysis, strategies to be considered are of Weakness/Opportunity type (benefiting from opportunities and overcoming existing weaknesses). By forming a Quantitative Strategic Planning Matrix (QSPM), W/O strategies of SWOT matrix were prioritized. As a result, increased budget for environmental control in the area (39.5), cooperation and coordination between the private and public sectors (69.4), equipping the public transportation with low-energy and green vehicles (48.4), widespread public awareness campaign (98.3), and transferring the polluting industries to suburban areas (78.3) were selected as top strategies for managing traffic-borne air pollutant in District 12 of Tehran.

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INTRODUCTION

Human activities such as population growth and urban development, various industries (like power plants, refineries, steel mills, etc.), motor vehicles, and building residential and commercial complexes can lead to air pollution (Yusefi Golboteh *et al.*, 2016). However, other sources of pollution such as explosions, waste incineration, fire, and building destructions cannot be ignored. According to reports, the share of stationary and mobile (vehicles) resources in relation to air pollution in different cities of Iran are 10-15% and 85-90%, respectively (Firoozi *et al.*, 2017). Therefore, it can be stated that vehicles are one of the main sources of urban pollution in the country, in which, automobiles play the greatest role

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(Kazemian *et al.*, 2015). Given the increasing urban traffic and various types of pollution, human being is at risk and the effects are evident in physical and mental health of the people as well as rising the economic damages (Leroy *et al.,* 2010). According to the literature, while exacerbating cardiovascular and respiratory complications in those suffering from respiratory diseases, air pollution is a major factor contributing to development of heart and respiratory diseases in healthy people (Eltyaminia and Hoseyni, 2015). Each individual breathes about 22,000 times and needs about 15kg air per day. Normally, human beings can survive 5 weeks without food and 5 days without water, but it is impossible to live on without air (Karimi and Musavi, 2017). Respiratory system is the first organ of the human body that is in direct contact with air pollution. Lung is responsible for absorbing oxygen and releasing carbon dioxide from the blood. When the concentration of air pollutants exceeds purification capacity of human lung, pollutants get deep into bloodstream and bring about heart and respiratory diseases such as disruption of oxygen transfer to body tissues, increased heartbeat, heart attack, reduced lung capacity, asthma, bronchitis, and lung cancer. Tehran is one of the most polluted cities in the world (Kazemian *et al*, 2015). According to Tehran's environmental studies, 70% of deaths in Tehran are due to respiratory and cardiac problems that are directly or indirectly related to air pollution (Rezaeian Ghiye Bashi, *et al*., 2017). Urban environmental protection is one of the most important issues that has been addressed in most countries of the world and is gradually being considered as the main urbanization issue (Nasrollahi and Poosh doozbashi, 2016). Cities, as centers of population attraction, are faced with numerous and different environmental problems, which have led to an increase in the severity of pressures on the environment, as a result of the occurrence of various types of environmental pollution, resource degradation, the reduction of natural spaces, and greater need for healthy environment. (Kashipazan Qomi and shirgir, 2017). The national 20-year vision of development in line with the 5oth article of the Iranian Constitution has emphasized on the importance of urban environmental issues and integrated urban management (Lesani and Edalatju, 2017). Waste and recycling management, improvement of green space and the mitigation measures for polluting industries are the most important environmental concerns of urban management (Asgari and Rahimi, 2017). It seems that municipalities play a major role n achieving the goals of urban environmental protection. As a result, municipalities face formidable challenges in terms of local planning and management (Shareepour, 2010). The traffic-born air pollution caused by urban transportation in Tehran has been discussed in many studies and research projects, however they are only analyzed as cost generating issue (Kamani *et al.*, 2014 Ramakrishna and Rao, 2015) and (Keykhosrovi and Lashgari, 2014). However, it could also generate income to compensate for at least some of the expenditures imposed on municipalities. Air pollution is one of the major problems of modern cities. Tehran is also among the cities facing the air pollution problem. According to reported statistics, about 70 to 80% of the pollution comes from mobile sources. Increased population along with large number of vehicles in traffic has made Tehran one of the most polluted cities in the world. Therefore, it is necessary to find a way to control Tehran's air pollution by employing strategic management methods. Using strategic management processes, it may be possible to design and develop environmental protection systems against air pollutants at local level. This can be realized merely by concentrating on strengths, weaknesses, opportunities and threats of metropolises. Today, the overcrowded cities and the urbanization have increased the need for automobiles and other means of transportation, and hence it seems that the existence of a reliable, efficient and economic public transport system with the least destructive biological effects in pursuit of sustainable development is a necessary step. Because urban transport is considered one of the main fields of economic development, this is a main issue for proper planning in urban transport (Shamsipour *et al*., 2015). Meanwhile, many studies have been performed on this subject. In "Assessment of exposure to air pollution caused by traffic using CALINE4", (Meline *et al*., 2011) have tried modeling the traffic-born air pollution. The research was conducted in Cracow. According to their research, the concentrations of NO_2 and PM_{10} were above the standard limits and it was the main cause of asthma in children of that region. (Dhyani and Sharma, 2017) conducted a research on "Sensitivity Analysis of CALINE4 Model under Mix Traffic Conditions" to determine input parameters and the level of impact on output parameters (predicted concentrations) in

Delhi city. Sensitivity analysis of CALINE4 model was performed for three hours input datasets indicative of various meteorological (wind speed, wind direction, height, purification class), traffic (traffic volume and emission factors) and road characteristic (road width). These parameters were measured in relation to CO pollutants and the results showed that, regardless of the source (traffic volume and emission factors), the meteorological parameters, wind speed and wind direction were influenced while surface roughness and height had relatively low impact on the model output. In another research, “prediction and analysis of near-road CO concentrations due to heterogeneous traffic using a simplified-type dispersion”, (Ahmad *et al*., 2018) analyzed a basic micro-scale simulation model to calculate near-road CO concentrations from heterogeneous traffic usually observed on Indian roads. The considered values were simulated with CALINE4 model and their results indicated that CO concentration decreased and became less effective at greater distances from the road and traffic. The purpose of this study is to develop a strategic plan for remediation of traffic-born air pollutants in urban areas. The secondary objective is to determine dispersion rates of CO and NO_2 as well as suspended particulate matters (SPMs) with a diameter between 2.5 and 10 µm. The current study has been carried out in District 12 of Tehran in 2018.

MATERIAL AND METHODS

The study area

District 12, at the heart of Tehran, is known as one of the oldest areas of this city. With 16.191m^2, this area consists of 6 districts and 14 neighborhoods. The most important features of this area is encircling Bazar-e Tehran and several state institutions and agencies, ministries, and embassies. This area is surrounded by Enghelab Eslami Street from the north, Shoosh Street from the south, Hefdah Shahrivar Street from the east, and Hafez and Vahdat Islami streets from the west. Besides, it has 56.39km arterial streets, 69.19km local access roads, 4 urban bus and car taxi terminals, 5km of bike path, 4.32km walkway, and 192 taxi and bus stations with a capacity of 7700 parking spaces (Veysi and Zarandian, 2009)(Fig. 1).

Turning points of District 12 include: Ferdowsi Square, Shemiran Square, Laleh Zar, and Pole Choobi from the north to Enghelab Eslami Street; Hasan Abad historical square (Hasht Gonbadan), Vahdat Eslami square, crossroad from the west to Hafez and Vahdat Islami streets; Jahan Pahlevan Takhti, Yakhchal, and Ghar square from the south to Shoosh Street; and Shahid Kafaei Amani, Khorshid Street, Mojahedin Street, Amir Kabir underpass, and Shahid Mahlati Highway from east to Hefdah Shahrivar Street, have a history as old as Tehran and beautiful buildings whose commercial texture has found insurmountable

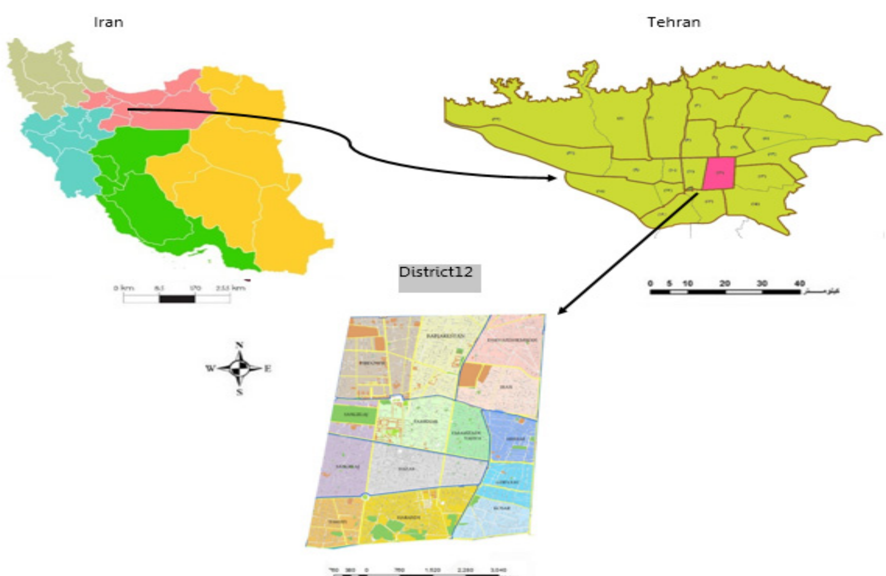

Fig. 1. Location of the study area

dominance in the area yet reminds the intimacy of the neighborhoods of Old Tehran.

MATERIALS AND METHODS

In the first stage of the study, using library resources, the researches carried out in the national and international were considered and the results, scores and weaknesses of the CALINE 4 model were determined. In the next step, using available resources, the inputs of the model and the information needed to execute the model were evaluated and was determined and compiled In the next step, using available resources, the inputs of the model was evaluated and the information needed to execute the model was determined and compiled (Zhang and Batterman, 2010). Then, modelling was carried out using seasonally measured data of suspended particles and CO/NO2 emissions from urban traffic. In the next step, experts' opinions were obtained using a questionnaire. And finally, a SWOT (Strength, Weakness, Opportunity, and Threat) matrix was formed to determine effective strategies in controlling pollutants. The research variables were dispersion rates of CO and NO_2 gases as well as traffic-born SPMs with a diameter between 2.5 and 10µm in three seasons (autumn, winter, spring of 2018). CALINE4, is a modeling program to assess air quality impacts near transportation facilities. It is based on the Gaussian diffusion equation and employs a mixing zone concept to characterize pollutant dispersion over the roadway (Makra, *et al.,* 2013). CALINE4 comes with a Windows user interfaces software for modelling emissions. Given that, in this research, (linear) traffic-born emissions is considered, this software is an appropriate tool. It can also receive meteorological and climate data and compute its impact on pollutants (Benson, 1984). Zoning of air pollutants in the District 12 of Tehran was carried out with this software. This package is a pollution modeling software derived from linear sources. Data attributed to near-road pollutants were entered as latitudes and longitudes (Y and X) into the software to model the area location (Zhang and Batterman, 2010). Then, the results of each pollutant at the considered points were inserted on Z axis. Output image of the software and dispersion model are shown by the various colors. It should be noted that measurement unit of latitude and longitude is based on (Universal Transverse Mercator) UTM (Kerstin *et al.,* 2007). Over the recent decades, increased irreparable losses caused by emissions of mobile resources have challenged policy makers and authorities. Annually, stationary and mobile sources of air pollution in District 12 of Tehran have released 26380 tons of CO, about 99% of which has been produced by mobile sources. Besides, a total of 1840 tons of nitrogen oxide emissions were produced, about 70% of which were produced by mobile source and 30% was released from stationary sources. Also, 5583 tons of volatile organic compounds (VOCs) were emitted, of which 7% was attributed to stationary sources (especially fuel stations) and 93% was due to mobile vehicles. What is more, 167 tons of sulfur oxides was emitted in the District 12, 69% of which was attributed to stationary sources. As regards, stationary and mobile sources of air pollution in the District 12 of Tehran have emitted a total of 2022 tons of suspended particles, 93% of which has been released from mobile sources (Bodaghpour *et al.,* 2011)

SWOT Matrix

SWOT analysis is an efficient tool for identifying the environmental conditions and internal capabilities of the organization. This efficient tool of marketing and strategic management is mainly based upon assessment of external environment of an organization. SWOT stands for Strength, Weakness, Opportunity, and Threat. Conceptually, strength and weakness refer to internal situation of an organization, while opportunity and threat are associated with external situation of an organization. (Sedighi and Vahdat Zade, 2013). Statistical population in this research includes the number of points needed for modeling pollutants. This research was carried out during rush-hour (6 a.m. - 8 a.m.) in the morning at 10 points of District 12 of Tehran. The studied pollutants were $PM_{2.5}$, PM_{10}, NO_2, and CO. The measurements were carried out during December, February, and May, due to changes in temperature.

Field Method for Pollutants Observation

At this step, 10 points were selected and SPMs with a diameter between 2.5 and 10µm as well as CO and NO_2 gases were measured. The concentration of pollutants in these points was compared with the standard (DOE, 2009). It is worth noting that all observations were performed during the day. TSI-

Dust Track and Seroquel S500 devices were employed for measuring SPMs and gases, respectively.

RESULTS AND DISSCUSION

First, the air pollutants - $PM_{2.5}$, NO_2, and CO in the District 12 were measured on December 5th 2017, February 7th, and May 11th in 2018. Then the data were analyzed statistically and modeled using CALINE4 software. Geographical locations of the studied points are presented in Table (1).

Selected sampling points in District 12 are shown in Fig. 2.

The results of sampling in 3 different seasons are shown in Tables 2, 3 and 4.

Modeling results of the pollutants

At this stage, dispersion rates of the pollutants were modeled using CALINE4 software for the three months. As shown in Fig. 3 to 5, southern part of the study area was more polluted than its northern part, especially in April. In the northern part of the area, CO concentration was about 30- 35ppm, and in the southern part, it reached 55ppm in February and April. Also, in middle part of the area, the concentration of this pollutant was about 38- 44ppm, in different months. Of course, high concentration of CO might be due to large market area in the eastern part which is resulted from the increased traffic. As shown in Fig. 6 to 8, southern part of the area was more polluted, particularly in February. NO_2 concentration was between 0.1 and 0.4ppm. Of course, the amount of this pollutant in April was less than the other two months, reaching 0.8 ppm to its highest level. Of course, the amount of this pollutant in April was less than the other two months, reaching 0.8ppm at the highest level. High NO_2 concentration

Table 1: Geographical coordinates of monitored areas

Points	Location	Longitude	Latitude
1	Ferdowsi - Nofeloshato	51°25'0.68"E	35°41'49.04"N
2	Enghelab – Pole Choobi	51°26'5.59"E	35°41'49.44"N
3	Hafez – Si tir	51°24'58.33"E	35°41'14.62"N
4	Amin Hozoor Junction – Amir Kabir	51°26'8.39"E	35°41'15.79"N
5	Panzdah Khordad - Khayam	51°24'59.01"E	35°40'44.35"N
6	Panzdah Khordad – Mostafa Khomeini	51°26'6.88"E	35°40'45.47"N
7	Khayyam - Mahdaviyan	51°24'52.58"E	35°40'18.40"N
8	Rey – Panzdah Khordad	51°26'10.49"E	35°40'19.43"N
9	Shoosh - Takhti	51°24'42.07"E	35°39'40.68"N
10	Shoosh Sq. - Rey	51°26'8.96"E	35°39'48.90"N

Fig. 2: Overview of District 12 and sampling points

Table 2: Results of sampling in December 2017

Points	CO(ppm)	No2(ppm)	Pm$_{10}$ (µg/l)	Pm$_{2.5}$(µg/l)
1	29.4	0.05	110	68
2	35.9	0.06	134	83
3	40.5	0.07	151	93
4	37.3	0.06	139	86
5	44	0.07	170	105
6	44.9	0.07	162	100
7	51.2	0.1	188	116
8	47.6	0.09	154	95
9	42.4	0.07	160	99
10	50.7	0.08	188	116
Standard	1-hr	1-hr		35
	35	0.1	100	

Table 3: Results of sampling in February 2018

Points	CO(ppm)	No2(ppm)	Pm$_{10}$ (µg/l)	Pm$_{2.5}$(µg/l)
1	31.1	0.06	118	73
2	33.5	0.06	133	82
3	37.8	0.07	151	93
4	34.8	0.07	143	88
5	37.6	0.08	164	101
6	38.3	0.08	167	103
7	46.4	0.09	183	113
8	43.1	0.09	170	105
9	49.1	0.09	190	117
10	54.6	0.1	193	119
Standard	1-hr	1-hr	100	35
	35	0.1		

Table 4: Results of sampling in April 2018

Points	CO(ppm)	No2(ppm)	Pm$_{10}$(µg/m3)	Pm$_{2.5}$(µg/l)
1	24.7	0.04	105	65
2	30.1	0.05	120	74
3	34.1	0.06	134	83
4	31.3	0.05	125	77
5	37.0	0.06	146	90
6	37.7	0.06	149	92
7	46.0	0.07	167	103
8	42.8	0.07	152	94
9	50.1	0.07	168	104
10	55.6	0.08	172	106
Standard	1-hr	1-hr	100	35
	35	0.1		

was due to heavy bus traffic at the terminal.

As shown in Figs. 9 to 11, southern part of the area was more polluted than its northern part. The concentration of this pollutant was between 65-113µg/m^3. The lowest concentration of SPMs<2.5microns was observed in February and April. High concentration of SPMs<2.5microns might be due to diesel-powered vehicles; e.g. buses. However, the problem attributed to regional particles has always had its own impact.

As shown in Figs. 12 to 14, concentration of 10-micron SPMs in southern part of the area was more than the other parts of studied area. SPMs concentration ranged between 105 and 193µg/m^3. As other pollutants, the lowest rate of SPMs<10-micron was observed in April. High concentration of

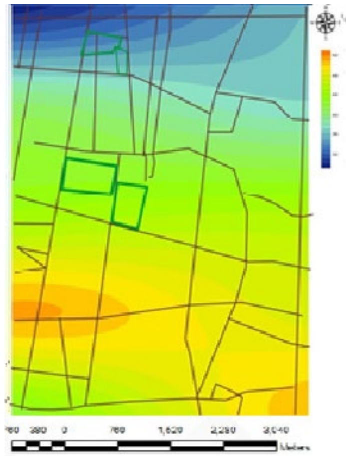

Fig. 3: CO dispersion in December

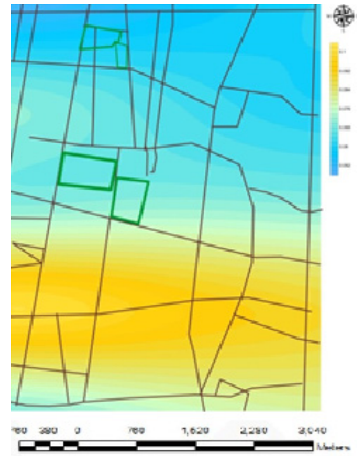

Fig. 6: NO_2 concentration in December

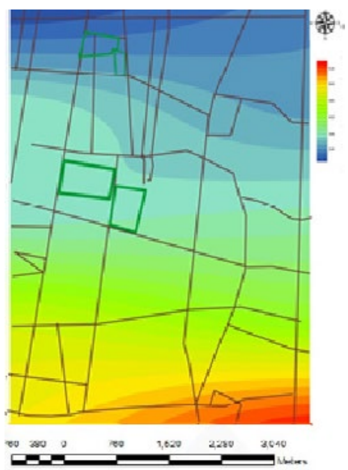

Fig. 4: CO dispersion in February

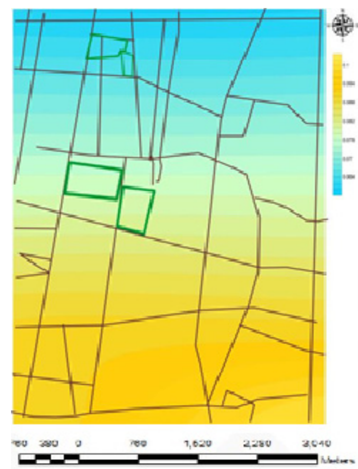

Fig. 7: NO_2 concentration in February

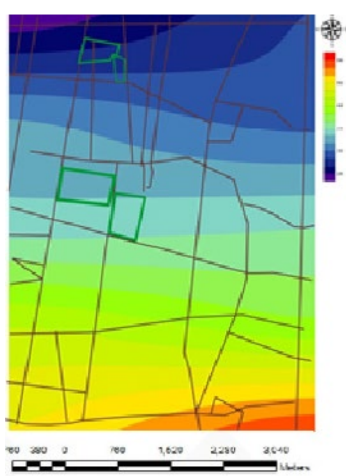

Fig. 5: CO dispersion in April

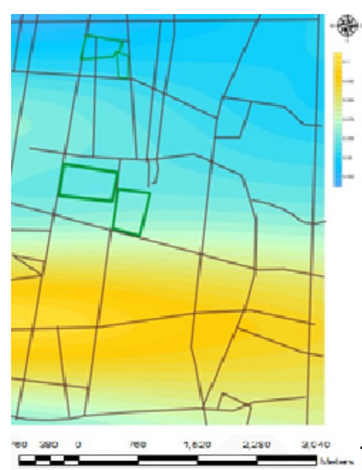

Fig. 8: NO_2 concentration in April

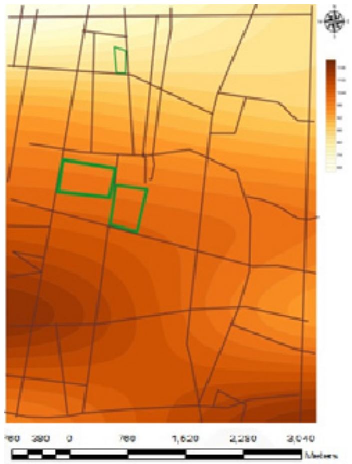
Fig. 9: 2.5micron SPMs in December

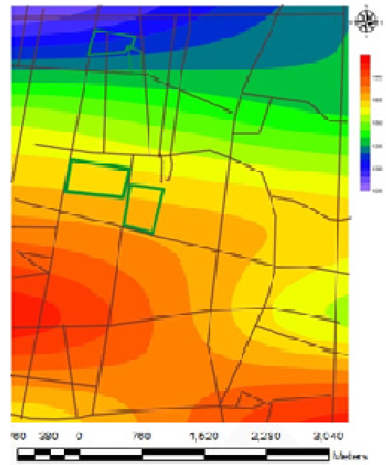
Fig 12: 10micron SPMs in December

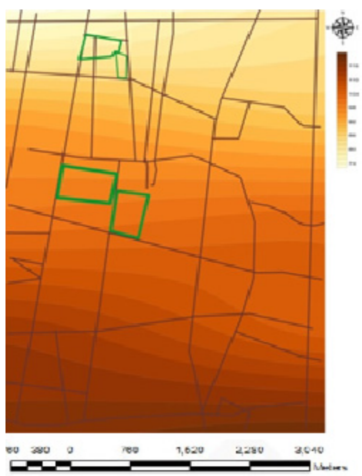
Fig. 10:: 2.5micron SPMs in February

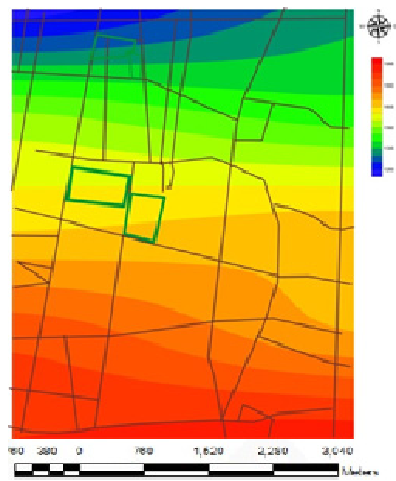
Fig. 13: 10micron SPMs in February

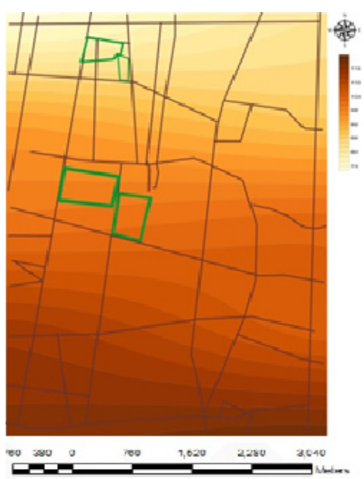
Fig. 11: 2.5micron SPMs in April

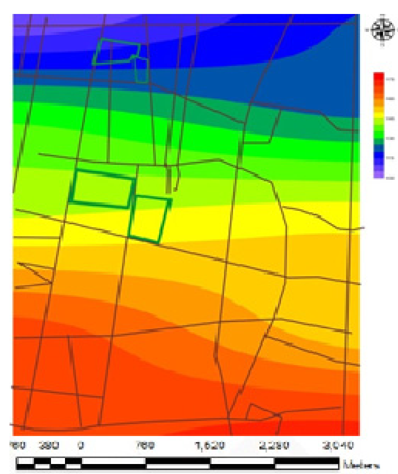
Fig. 14: 10micron SPMs in April

Table 5: internal factors of SWOT matrix

Weaknesses (W)	Strengths (S)
• Being located at high-traffic area of the city • Low-income residents with worn out vehicles • Bazar-Bozorg as well as some guilds (such as audio equipment, spare parts, etc.) and the Islamic Consultative Assembly which attracts all residents of Tehran*2 • Heavy traffic because of various markets in the area • Lack of investment on developing the public culture regarding this area	• Central metro station • Bazar that prevents vehicle transportation in a vast area*1 • High access to public transports • Being located at the traffic plan area • Proximity to parks such as Park-e Shahr

*1- Bazar is a vast area in which vehicles are not allowed. Measurements indicated that it is less polluted so this can be regarded as one of the strength of the area.

*2- With Bazar in this area, more people may communicate in/out so this can be regarded as a weakness.

Table 6: External factors of SWOT analysis

Threats (T)	Opportunities (O)
• *Increased migration to Tehran metropolis* • *Lack of attention to for comprehensive plans and approvals of executive programs of the municipality* • *Pollution caused by air pollutants, geographic location of the area, recent changes in climate condition, and hazes that cause many problems in Tehran every year* • *Multi-core structure and the large urban area of Tehran metropolitan city* • *Increased facilities in private transportation system compared the public one*	• *Cooperation between municipality and the DOE on air pollution* • *Thinking of environmental protection at country, city, region and district levels* • *Developing a multi-year approach by government agencies and bodies based on reducing air pollution in the metropolitan cities such as Tehran* • *High influence of media on changing the views of authorities and managers and citizens* • *Developing promotional programs to improve the environmental condition**

*lots of advertisements in the national media and city billboards over the past years can be a great help for the environment.

Table 7: Internal factors' weights

	No.	Weight	Rank	Weight point
Strengths	1	0.12	4	0.48
	2	0.09	1	0.09
	3	0.1	2	0.2
	4	0.11	3	0.33
	5	0.08	1	0.08
Weaknesses	1	0.12	4	0.48
	2	0.08	1	0.08
	3	0.12	4	0.48
	4	0.1	3	0.3
	5	0.08	1	0.08
Total		1		2.6

Table 8: External factors' weights

	No.	Weight	Rank	Weight point
Opportunities	1	0.1	3	0.33
	2	0.1	2	0.2
	3	0.12	4	0.48
	4	0.1	3	0.33
	5	0.08	1	0.08
Threats	1	0.12	4	0.48
	2	0.08	1	0.08
	3	0.1	3	0.3
	4	0.09	2	0.18
	5	0.11	3	0.33
Total		1		2.79

SPMs<10-micron might be due to diesel-powered vehicles; e.g. buses. However, the problem attributed to regional particles has always had its own impact.

- Determining internal and external factors using SWOT matrix

Table 5, indicates internal strengths and weaknesses. Table 6 shows effective external threats and opportunities.

After prioritizing the factors by expert analysts, the column was normalized to obtain weights between zero and one for each actor, some of which would be one. This column is calculated based on the AHP method (Tables 7 and 8).

Internal - External (IE) Matrix

At this stage, based on final scores derived from matrix analysis of internal and external factors for managing air pollution reduction in the area, in four scenarios (aggressive, contingent, adaptive, and defensive) were determined. For this purpose, total weight points of internal factors matrix and external factors matrix were calculated and depicted the table of IE matrix. According to the results obtained from evaluation of the Internal Factors Evaluation (IFE) and

Table 9: Quantitative strategic planning

Rank	Strategies	Total score
1	Increasing investment funds on controlling environmental pollution in the area (WO1)	39. 5
4	Extensive education and culture promotion programs for residents of the area (WO2)	98.3
2	Organized and parallel cooperation between private and public institutions (WO3)	69.4
3	Equipping public transportation to low-energy and green cars (WO4)	48.4
5	Transferring several classes into less populated areas (WO5)	78.3

external factor evaluation (EFE) matrices, total scores are equal to 2.6 and 2.79, respectively. The research findings indicated that air pollution reduction strategy in this District is in defensive scenario (WO). Thus, existing capabilities and potentials as well as available opportunities should be used in the best possible way so as to be successful in controlling traffic-born air pollution. With regard to IFE and EFE matrices, WO strategies (based upon making use of opportunities and turning weaknesses into strengths or reducing severity of the weaknesses) have to be considered. Now, by forming a QSPM, strategies in WO cell of the SWOT matrix can be prioritized. Table 9, shows the QSPM strategies:

CONCLUSION

With development of transportation system, inappropriate vehicle production, and the use of low-quality fuels, inevitable increased pollution in these areas endangers the public health. The purpose of this study was to determine $PM_{2.5}$, PM_{10}, NO_2, and CO emission dispersion, caused by traffic in District 12 of Tehran, using CALINE4 software. At first, 10 points were selected for measurement of the aforementioned pollutants. According to the research findings, in 3 months of 3 different seasons, Co level varied between 30-55ppm. Also, NO_2 level, at all stations in Tehran, varied between 0.1- 0.4ppm; values above 0.05 represent pollution with diesel fuel vehicles which probably are worn out buses. Modeling of suspended particles smaller than 2.5microns indicated that pollution at all the 10 stations was between 65-113µg/m^3, which was above standard (35µg/m^3).). Likewise, at all months, the amount of suspended particles smaller than 10 microns varied between 105-193µg/m^3, and in some areas, it was above the DOE standard (150µg/m^3).

With regard to IFE and EFE matrices, WO strategies (based upon making use of opportunities and turning weaknesses into strengths or reducing severity of the weaknesses) have to be considered. By forming a QSPM, strategies in WO cell of the SWOT matrix were prioritized. “Increasing investment funds on controlling environmental pollution in the area”, with weight point equal to 5.39, ranked the first. Extensive education and culture promotion programs for residents of the area, organized and parallel cooperation between private and public institutions, equipping public transportation to low-energy and green cars, and transferring several classes into less populated areas were placed in the lower priorities, respectively. This research also had limitations such as: lack of cooperation of municipal organs such as municipality and traffic control organization during measurement, different traffic loads at different hours of a day, and limitations caused by existing devices in Iran which requires buying more precise measurement devices.

Recommendations

- With regard to IFE and EFE matrices, it is better to increase investment budget in the environmental control sector of the area.
- Due to the zoning of air pollution, in terms of pollution by CO, whose concentration was higher in southern part of the area, studying the causes of the increased pollutants in this part of the area and managing the issue seem necessary.
- It is recommended to randomly monitor different kinds of vehicles and compare the results with the findings of this research.
- According to the research findings, it is necessary to identify high-risk areas and minimize its traffic by setting rules.
- According to the modeling of pollutants in southwestern part of the District 12, Diesel-powered vehicles exacerbate pollution. Especially, at the beginning of Panzdah Khordad Street, rush-hour was observed. Thus, it is better to change the location of bus stations and to neighboring streets with light traffic.
- The use of public and private electric vehicles in this area seems inevitable.

ABBREVIATIONS

Co	Carbon Monoxide
No_2	Nitrogen Dioxide
So_2	Sulfur Dioxide
PM_{10}	Particulate Matter<10
$PM_{2.5}$	Particulate Matter<2.5

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CONFLICT OF INTREST

The authors declare that there are no conflicts of interest regarding the publication of this manuscript. In addition, the ethical issues; including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy have been completely observed by the authors.

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