



Original Article

Air Pollution as an Environmental Hazard; A Case Study of Karna Basti Bahawalpur, Pakistan

Received Date:10/05/2011

Accepted Date:03/17/2012

Abstract

Air pollution has now been one of the major problems faced by every country of the world. This is because increase in the production and use of fossil fuels in many ways e.g. industrial revolution, rapid increase in urban population results in the increase in urban transport which ultimately pollute the environment. Many cities around the world, particularly in developing countries, are experiencing rapid growth. Larger cities with highly concentrated industry, intensive transport networks and high population density are threats to urban environment. More people, more industry, and more motor vehicles cause ever-worsening air pollution which poses serious environmental threat in many cities. The World Health Organization (WHO) and other international agencies have long identified urban air pollution as a critical public health problem. The study focused on major pollutants from different sources and impact of pollutants on human health. The study provides links between air pollution and human health. Investigation finds out a complete scenario of air pollution of the study area and the research also helpful for discussing about the importance of green spaces in maintain the urban sustainability. How urban green spaces are helping in decreasing air pollutants level in the atmosphere. Increasing human activities in urban arena means higher demand for energy, goods and services in one side, and more emission and material wastes on the other.

Keywords: *Air Pollution, Ecosystem, Environmental Hazard, Human Health, Pollutant, Urban Environment.*

M. Anwar^{1*}
M. Ahmed¹
F.Asghar²

1-* Department of Geography, GC
University Faisalabad, Punjab, Pakistan
2-Department of Geography, The Islamia
University of Bahawalpur, Punjab,
Pakistan

Email: mushahid.anwar@gmail.com

INTRODUCTION

Air pollution is a compound of hazards elements in the physical environment and harmful to human health. It is important to emphasis that a hazard is something with the potential to cause harmful effects to people, property and/or the environment. The concept of environmental pollution means the presences of impurities in the environment. The impurities called pollutants may be natural or artificial in their nature. Most of the serious and significant types of pollution results from the human activities such as production and consumption of fuel to run the economic cycle. Urban air pollution is relatively a recent phenomenon as urbanization and related problems start

gaining an increasing attention. (Boubel, Fox et al. 1994) stated that during last few decades people were experiencing a shift in nature of air pollution from spatially localized issue to much wider and ubiquitous phenomenon. Along with the global concern on air pollution changed from those closely related to particular point sources such as Sulphur dioxide and hydrogen fluoride to the ones associated with mobile or even non-point sources such as carbon monoxide, oxide of nitrogen, hydrocarbons and secondary pollutants, e.g. photochemical ozone. The change driven largely by boosting motor vehicle population was documented elsewhere ((Faiz, Weaver et al. 1996); (Mage, Ozolins et al. 1996) and it posed the

governments and those policy makers to tackle a new challenge of air pollution management and related environmental issues. Despite above trends in transition of the air pollution problems, each country,

region and area have different problems attributed by their degree of development, culture, geography and characteristic.

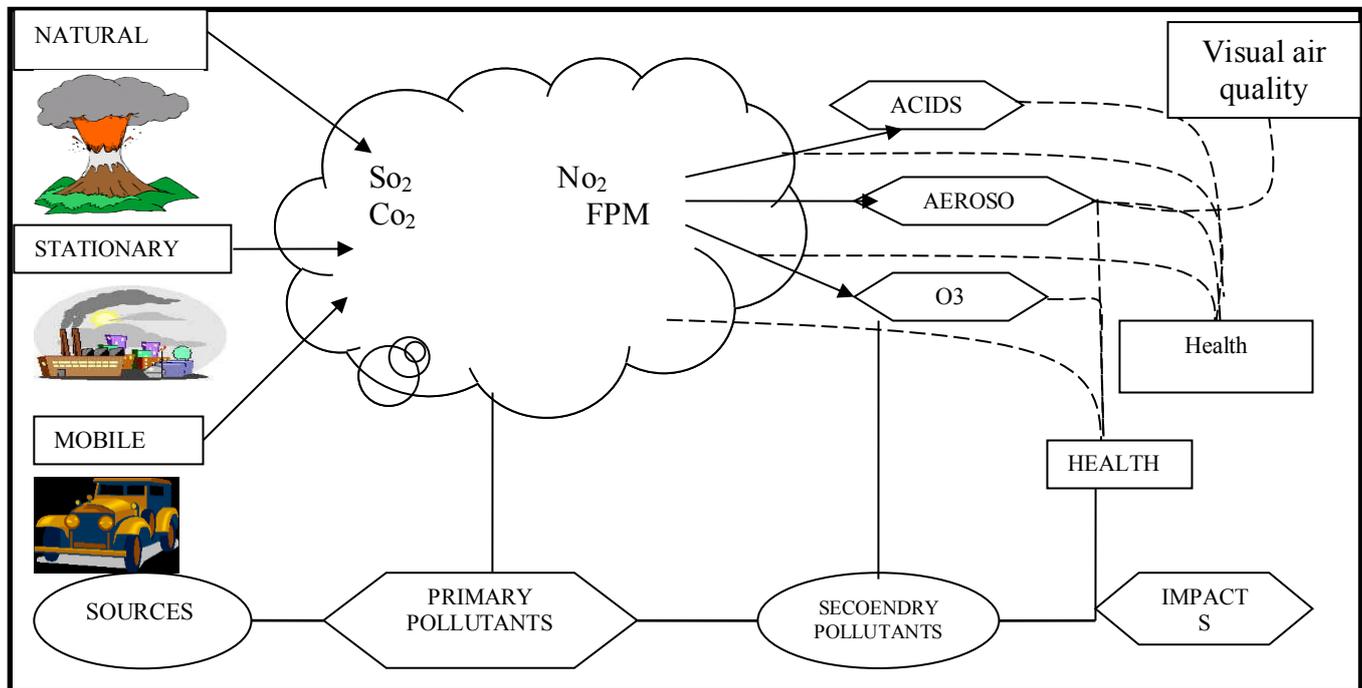


Fig 1. Air Pollution Source and effect Model

Source: Anwar, 2009

According to the Economic Survey of Pakistan, densely populated cities of Pakistan are among the highest cities in the world in terms of Air Pollution level, causing serious health and environmental problems. The health impacts in the region are already estimated to be substantial. The (W.H.O. 2002) estimated that urban air pollution contributed to approximately 800,000 deaths and 6.4 million lost life-years worldwide in 2000, with two-thirds of these losses occurring in rapidly urbanizing countries of Asia. Pakistan has suffered wide spread and wide ranging environmental degradation in recent decades. In Punjab deterioration is mainly due to the rapid urbanization industrialization and population explosion vehicular and industrial emission domestic energy use open burning and municipal waste agriculture residues and land use change. The increase amount of waste generated by these phenomena's undoubtedly has resulted in

various type of environmental problem. The total population of Punjab with the growth rate of 3.5% is about 73 million. It is the most densely populated province of Pakistan and has a population density of 353 person per square kilometer about 31 percent of its population resides in urban centers where as rest lives in rural areas. Like other cities of Pakistan in Bahawalpur the major source of air pollution is vehicles emissions. There are different types of vehicles categorized two wheelers, three wheelers and four wheelers, two and three wheelers are contributed more in increasing air pollution. Two stork auto rickshaws are emitted large amount of pollutants and also increase the noise pollution level in the atmosphere. Traffic-related emission is a complex mixture of pollutants comprised of Nitrogen oxides (including nitrogen dioxide), Carbon monoxide, Sulphur dioxide, Volatile organic compounds etc. This concentration of pollutants varies both spatially (by location) and temporally (by time). Exposure to

pollutants is evaluated in urban areas with high traffic volumes and heavily traveled highway corridors (Peace, Owen et al. 2004); (Zeka, Zanobetti et al. 2005). High levels of vehicle-related emissions have been linked to high density traffic sites (Campbell, Oldham et al. 2005). Street canyons (streets lined with

tall buildings that hold up the dispersion of air pollutants) and areas very close to busy roads typically have a high concentration of emissions (Hoek, Carranza-Torres et al. 2002); (Jatinder, Chadha et al. 2006); (Longley, Gallagher et al. 2004).

Table 1. Major pollutants, Sources and Impact

Pollutant	Source	Health
Ozone (O₃)	Action of sunlight on NO ₂ , HC's	Asthma ; Bronchitis ;Irritation to the eyes and mucous membranes ;Headaches ;Nose & throat irritation
Lead	Transportation Industry	Reduced birth weight and lowered intelligence
Carbon dioxide	Burning of fossil fuels, Combustion in motor Vehicles	Headaches ;Asphyxiation, Impairment of performance on tasks requiring attention, Aggravation of cardiovascular disease Enhances global warming
Suspended particles	Burning of fossil fuels, un tar roads, mining dust and agriculture	Damage to lung tissues causing respiratory disease
Sulphur dioxide	Burning of fossil fuels (coal)	Causes constriction of the airways in people with asthma, repeated exposure causes a condition similar to bronchitis. Increased risk of acute respiratory disease, Causes acid rain.
Nitrogen dioxide	Burning of fossil fuels especially motor vehicles	Can irritate the lungs, aggravate the condition of people suffering from asthma or chronic bronchitis
Hydrocarbons	Vehicles and industrial processes	Can cause some defects in babies during pregnancy or cancer. Precursor to photochemical smog, which causes respiratory diseases
Carbon monoxide	Vehicle emissions	Restricts oxygen uptake ;Causes drowsiness, headaches, death
Heavy metals	Industry and motor vehicles	Heavy metals can cause cancer, defects in babies during pregnancy.

Source: (Mark 2005)

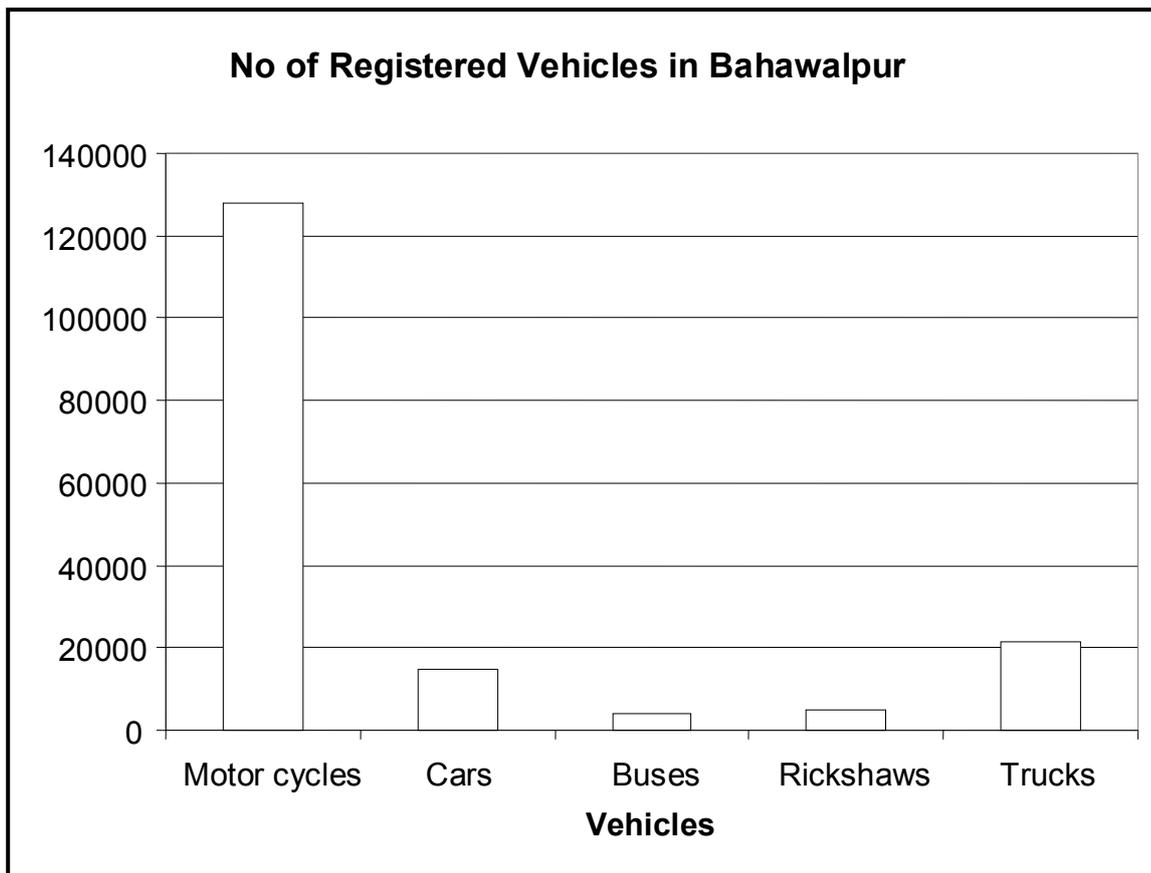


Fig 2.No. of Registered Vehicles in Bahawalpur

MATERIAL & METHODS

This study uses primary and secondary data sources. Primary data is obtained from the inhabitants, concerning departments of air pollution, EPA Environmental Protection Agency of Punjab. Medical centers of nearby areas and main health center of the city. Secondary data is obtained from government reports, District Census report of the Bahawalpur. Field investigation involved three levels. First level was interview with the inhabitants about the Air Pollution, knowing their views about the air quality of their area the ratio of different diseases caused by air pollution. Secondly In – depth interviews have been taken with the concerned departments like EPA Environmental Protection Agency to know about the current situation of air quality of Bahawalpur City. The data obtained after completing the field research is tabulated by applying Statistical Techniques (Chi-Square & Correlation). Finally, field observation which is the most important part of the research, involving people's attitude in producing and controlling

the air pollution and how people are minimize the effects of air pollution by using the nearby park or green spaces to refresh their mind.

Results:

The results shows the quality of air in the study area as well as the in the Bahawalpur City, relationship of different diseases associated with Air Pollution and the Impact of Air Pollution on the Sustainability of Urban Environment.

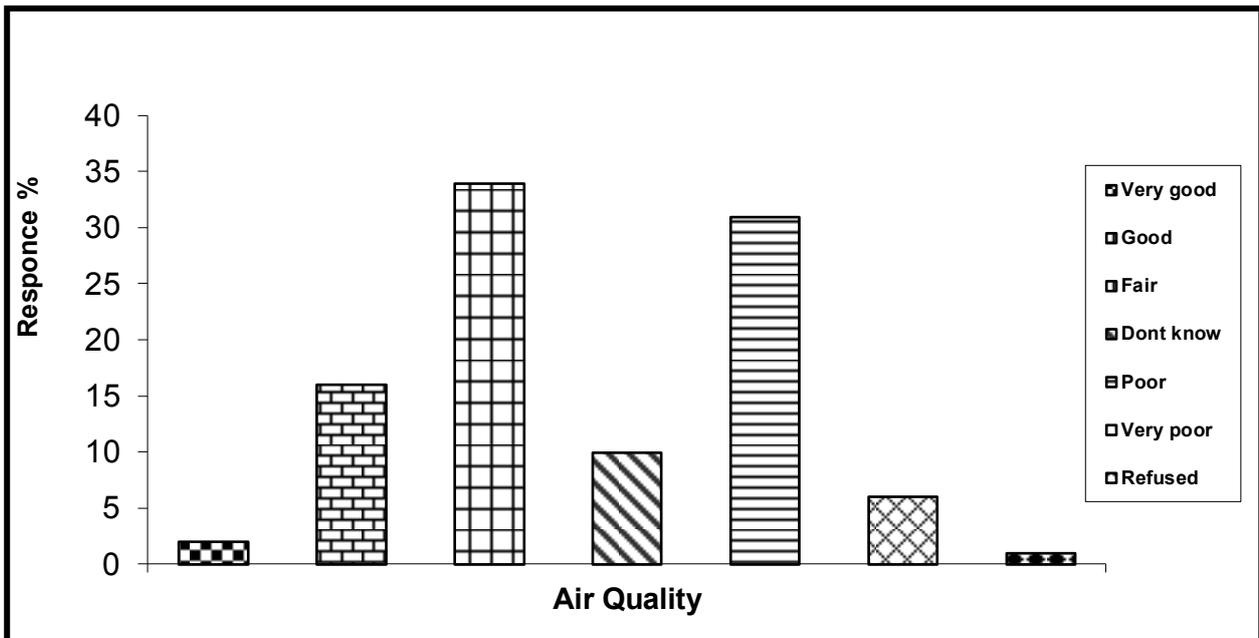


Fig3. Respondents views about Air Quality
Source: Anwar, 2009

To know the views of people about air quality 7 point scale is used in which 11% peoples are don't know about their air quality because of their daily busy life they have no time to observe all these phenomena, 34%

says air quality is fair means not very good and not very bad. 31% says air quality is poor and 6% says very poor. The positive view about air quality like good and very good is only 18 %.

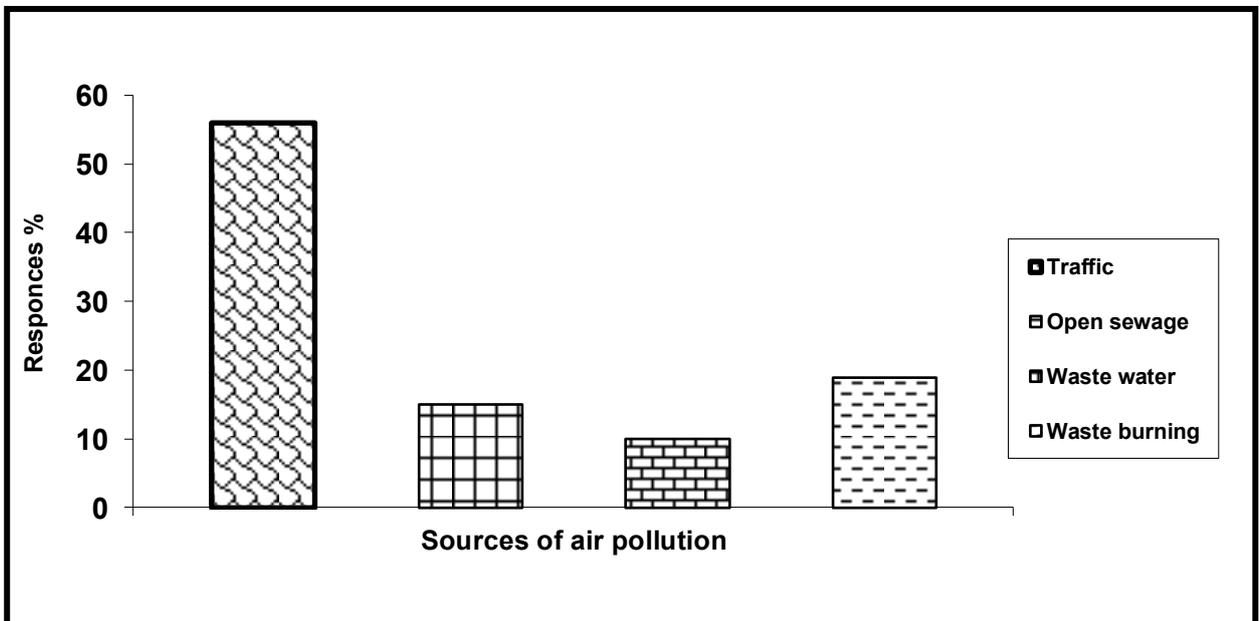


Fig4. Major sources of Air Pollution
Source: Anwar, 2009

There are different sources which cause air pollution such as traffic and industry are the major global sources of air pollution but on local and small level the sources are included sewerage waste water waste burning etc. The

above graph shows that the major source of air pollution is road traffic about 56% and the second major source is waste burning are 19%. It emits different types of gasses in the atmosphere. Waste water and open sewerage

which is both 25% because in Bahawalpur the sewerage system is mostly open and the

gasses emitted from the sewerage water causes increase in the air pollution.

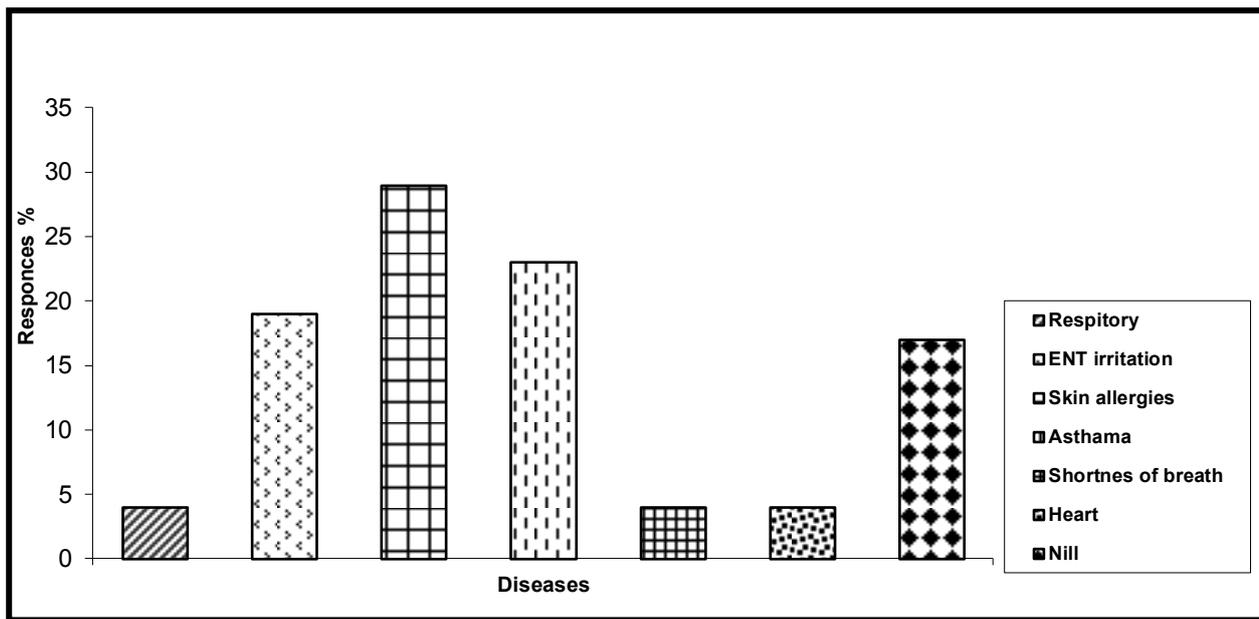


Fig.5 Diseases due to Air Pollution
Source: Anwar,2009

The pollutants in the air create many serious health problems. Because the air we inhale are composed of very dangerous pollutants which cause many diseases. The above graph shows percentage of different diseases in result of air pollution, in which skin allergies due to dust in the air are very high 29% and Asthama a common diseases is 23% the high level of asthma in the area indicates that here

the pollutants and the air are very serious and the level of air pollution is also very high. Eye, Nose and Throat irritation is 19% which is also due to the high level of dust and smoke in the air. Respiratory infection and shortness of breath is both 8% and heart diseases is only 4% and 17% peoples have suffer no diseases because they are aware how to prevent themselves from air pollution. Frequency of air quality crosstab with diseases it shows that the relationship between them is very strong and statistically significant which shows that air quality has an impact on human health.

Table 2.Summary of chi square result of air quality and diseases

Cross tabulation	χ^2	α
Chi square	39.031	.125

N=100, (χ^2) Chi square value, (α) level of significant statistically significant at 5%
Source: Anwar, 2009

Green spaces such as parks playgrounds etc are play very important role in decreasing air pollutants from the atmosphere. After analyzing the data in SPSS and using the method of frequency it is cleared that only 14% visit the nearby green space daily and 11% visit after 2 or 3 days to refresh there mind 34 % people are visited on weekend when they are free from their office work 6% visit monthly while 35 % are those people

who never visited the green spaces. The high percentage of non-users to the green spaces is due to the unawareness.

Change in daily Activities due to Air pollution

Frequency of air quality crosstab with change in activities of peoples shows that there is a strong relationship between both the variables, from the result is clear that air

quality of the area have strong impact on the daily activities of peoples.

Figure 5: Summary of Chi-square result of Air Quality and changes in the Activities of Peoples

Conclusion

Air is essential for the survival of human beings as well as other living organisms. The average adult requires about 15 Kilograms of air for whole day (EPA 2009) from this fact the importance of air can be understood. The amount and form of green spaces varies considerably at every conceivable level, with each city containing many different types of urban green spaces. To the total urban green spaces of a city plays a significant role in moderating the physical stresses which are typical of the urban environment, air quality, e.g. is improved by the adsorption of dust and pollutants and release of humidity (Anwar 2008). EPA conducts a survey of 34 district of Punjab in 2002 -2004 in order to know about the air quality of different districts of Punjab. After this survey, no such type of survey has been conducted to monitoring the air pollution level in the country. Findings of the research showed that the study area is severely affected with air pollution. Open drains, sewerage smell, waste burning and most important vehicles are adding pollutants continuously in the atmosphere. Peoples are suffering different type of diseases in which skin allergies is very common. For the reduction in air pollution there is no public park or green spaces in the study area, that why the urban environment is severely affected in the research area. Regular monitoring of ambient air quality is still not systematic in Pakistan.

REFERENCES

- Anwar, M. M. (2008). An Investigation of Public Parks and Life Quality in Karachi-Pakistan. , VDM Verlag Dr. Müller Aktiengesellschaft & Co. KG, Germany.
- Boubel, W. R., D. L. Fox, et al. (1994). Fundamentals of Air Pollution. New York, Academic Press.
- Campbell, A., M. Oldham, et al. (2005). "Particulate Matter in Polluted Air May Increase Biomarkers of Inflammation in Mouse Brain." *NeuroToxicology* 26(1): 133-140.
- EPA (2009). Air Quality Index, U.S. Environmental Protection Agency Office of Air Quality Planning and Standards Out reach and Information Division Research Triangle Park, NC.
- Faiz, A., C. S. Weaver, et al., Eds. (1996). Air Pollution from Motor Vehicles: Standards and Technologies for Controlling Emissions. Washington, DC, The World Bank.
- Hoek, E., C. Carranza-Torres, et al. (2002). Hoek-brown failure criterion – 2002 edition. 5th North American Rock Mechanics Symposium and 17th Tunneling Association of Canada Conference NARMSTAC Toronto, Canada.
- Jatinder, K., B. Chadha, et al. (2006). "Optimization of Medium Components for Production of Cellulases by *Melanocarpus* sp. MTCC 3922 under Solid-state Fermentation." *World Journal of Microbiology and Biotechnology* 22(1): 15-22.
- Longley, I. D., M. W. Gallagher, et al. (2004). "Street canyon aerosol pollutant transport measurements." *Science of The Total Environment* 334-335(0): 327-336.
- Mage, D., G. Ozolins, et al. (1996). "Urban Air Pollution in Megacities of the World " *Atmospheric Environment* 30(5): 681-686.
- Mark, C. (2005). "Health Effects of Air Pollution." Retrieved 1st Jan, 2012, from http://www.ecotransit.org.au/ets/air_quality.
- Peace, H., B. Owen, et al. (2004). "Identifying the contribution of different urban highway air pollution sources." *Science of The Total Environment* 334-335(0): 347-357.
- Punjab, G. o. (2009). Vehicle Registration in Bahawalpur, Punjan Pakistan, Excise and taxation Department of Bahawalpur, Punjab Pakistan.
- W.H.O. (2002). The World Health Report 2002. Printed in France, World Health Organization.
- Zeka, A., A. Zanobetti, et al. (2005). " Short term effects of particulate matter on cause specific mortality: effects of lags and modification by city characteristics." *Occup. Environ. Med* 62(0): 718-725

Journal of Biodiversity and Ecological Sciences (JBES®)
Publish Your Work in This Journal

Submit your manuscript here: <http://www.jbes.ir>

