



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

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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 i.e Karna Basti, Bahawalpur and the research also helpful for discussing about the importance of green spaces in maintain the urban sustainability and show 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.

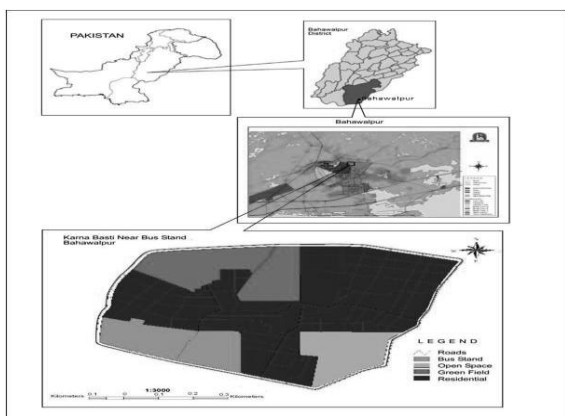
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1. INTRODUCTION

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 the human activities such as production and consumption of fuel to run the economic cycle ( Fig 1).

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.

According to the Economic Survey of Pakistan (Ashfaqe 2000), densely populated cities of Pakistan are among the highest cities in the world in terms of Air Pollution level, causing serious health and the region are

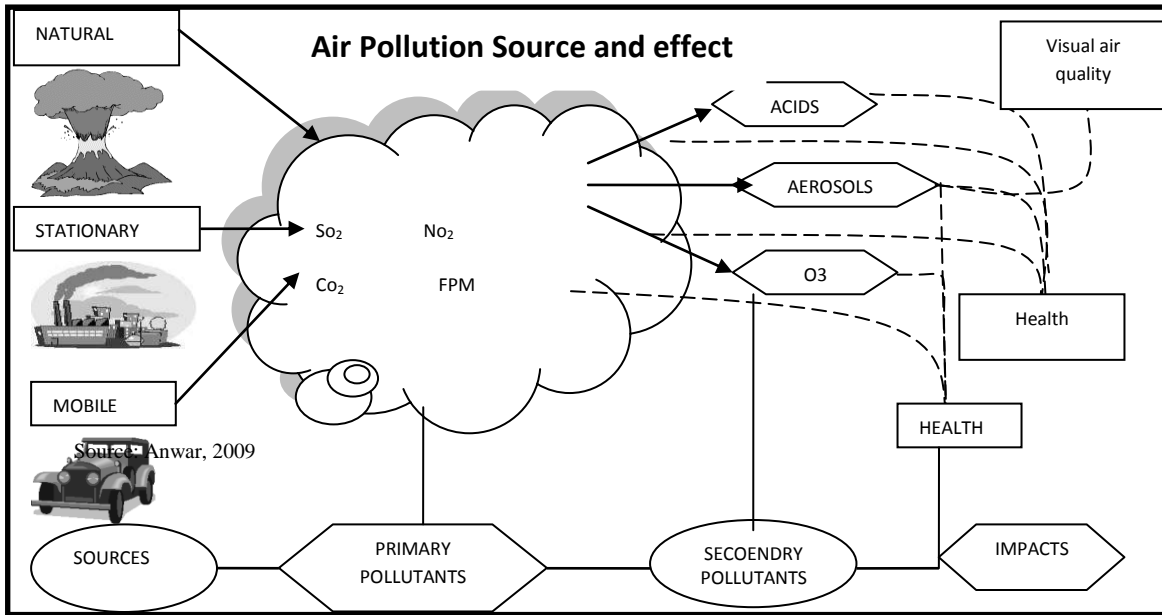


Source: Anwar,2009

Fig. 1: Map of Karna Basti, Bahawalpur

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**Fig. 2: Air Pollution Source and effect Model**

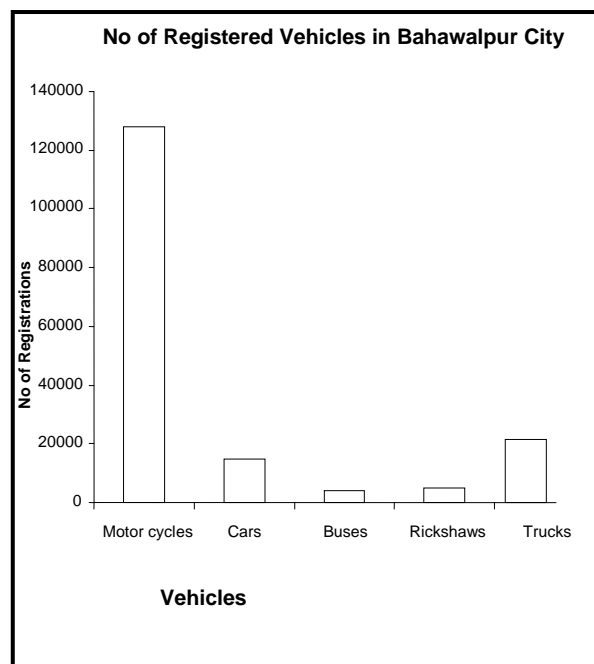
already estimated to be substantial. The (W.H.O. 2002) estimated that urban air pollution contributed to approximately 800,000 deaths and 6.4 million lost life-years worldwide in 2000, with two-thirds of these losses occurring in rapidly urbanizing countries of Asia. Pakistan has suffered wide spread 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 have contributed more in increasing air pollution. Two stork auto rickshaws 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); (Zanobetti *et al.* 2005). High levels of vehicle-related emissions have been linked to high density traffic sites (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, *et al.* 2002); (Chadha *et al.* 2006); (Gallagher *et al.* 2004).

**Table 1: Major pollutants, Sources and Impact**

Pollutant	Source	Health
Ozone (O <sub>3</sub> )	Action of sunlight on NO <sub>2</sub> , HCs	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)



Source: (Govt of Punjab 2009)

**Fig. 3:No. of Registered Vehicles in Bahawalpur**

## 2.

### **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 and 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.

### **Description of Investigated Area**

The study area is located in the north eastern side of Bahawalpur City named as Karna Basti. "The concept of Basti means Congested settlement with a high population density, having grown in an unplanned manner and facing problems (Amitabh Kundu and Somnath Basu 1999).The absolute location of the study area is 76°17'19.19" E -32°55'59.50" N, it is located at the back side of general bus stand of Bahawalpur

### **Karna Basti (Study Area)**

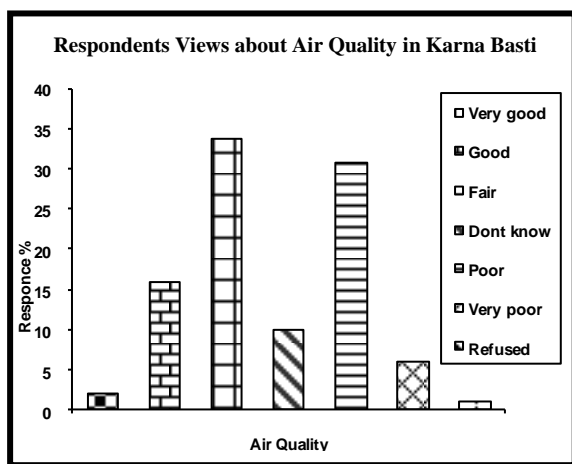
The study area was established in 1965 because of the increase in population pressure in wall city .so

that's why people move to the surrounding nearby area. After some time this area has established very congested settlement with no planning and facing many problems. There is a vast commercial area around it. The historical wall city is on the south side of the area. On the west side same kind of congested settlements like Karna Basti, Aziza Abad colony, Bismillah colony and Bindra Basti are found, on eastern side is different extended newly undeveloped colonies are found such as Shahdab Colony, Iqbal Town etc. Green fields are found on north side of the study area and eastern side of the area. In Bahawalpur there are 18 union councils. The study area is included in union council no 11, the total population of this union council is 25000 see also Fig 1.

**2. RESULTS**

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

To know the views of people about air quality 7 point scale is used in which 11% peoples are did not know about their air quality because of their daily busy life they have no time to observe all these phenomena, 34% said air quality is fair means not very good and not very bad. 31% said air quality was poor and 6% said very poor. The positive view about air quality like good and very good is only 18% see (Fig.4).

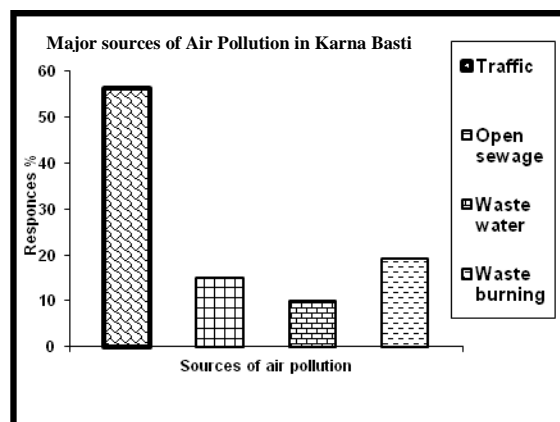


Source: Anwar, 2009

**Fig. 4: Respondents views about Air Quality**

There are different sources which cause air pollution such as traffic and industry are the major global sources of air pollution but on local the sources includ sewerage waste water and waste burning etc. (Fig.5) 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

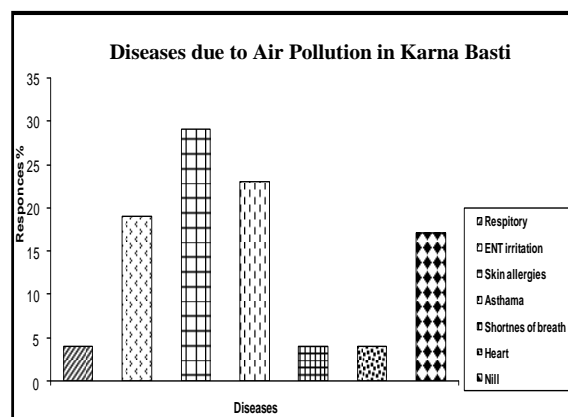
in the atmosphere. Waste water and open sewerage which is both 25% because in Bahawalpur the sewerage system is mostly open and the gasses emitted from the sewerage water causes increase in the air pollution.



Source: Anwar, 2009

**Fig. 5: Major sources of Air Pollution**

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. (Fig 6) 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 Asthma 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



Source: Anwar,2009

**Fig.6: Diseases due to Air Pollution**

quality crosstab with diseases, (Table 2) shows that the relationship between them is very strong and

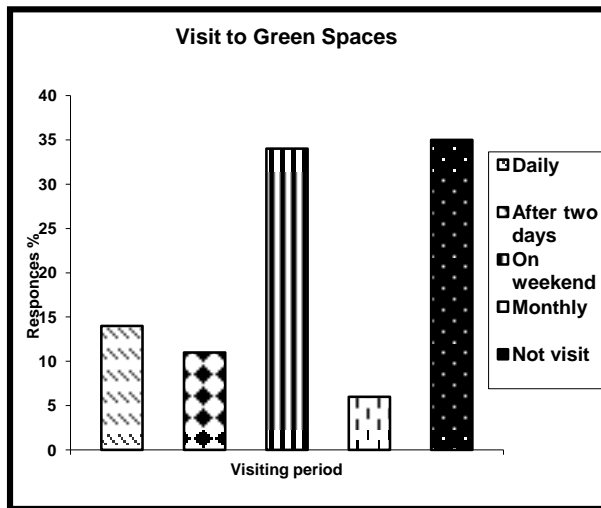
statistically significant which shows that air quality has an impact on human health.

**Table 2: Summary of chi square result of air quality and diseases**

Cross tabulation	$\chi^2$	$\alpha$
Chi square	39.031	.125

N=100, ( $\chi^2$ ) Chi square value, ( $\alpha$ ) 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 (Anwar 2008). After analyzing the data in SPSS and using the method of frequency, that reflected in (Fig.7), 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 visit 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.



Source: Anwar, 2009

**Fig. 7: Visit to Green Spaces**

**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 table 3, it is clear that air quality of the area have strong impact on the daily activities of peoples.

**Table3: Summary of Chi-square result of Air Quality and changes in the Activities of Peoples**

Cross tabulation	$\chi^2$	$\alpha$
Chi square	41.238	.252

N=100, ( $\chi^2$ ) Chi square value ( $\alpha$ ) level of significant statistically significant at 5%  
Source: Anwar, 2009

**3. 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.

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