

Full Length Research Paper

Air pollution kills 15,000 Bangladeshis each year: The role of public administration and government's integrity

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The paper explores the susceptibility of the urban population of Bangladesh to air pollution, recommend measures to be adopted for prevention of air pollution. The large number of children, street children, local streetwalkers, and rickshaw pullers in Dhaka City are at particular risk from this air pollution. Young children are mostly exposed to cadmium (Cd) through inhalation of smokes and contaminated soils and dust from industrial emissions and sewage sludge. The high lead (Pb) in the environment from gasoline, paints, ceramics, batteries, etc., has also been factor to increase the risk of polluted air. The study was done through internet, seminar and literature survey on global and regional information on Environment, analysis of the existing situation in Bangladesh. Air pollution kills 15,000 Bangladeshis each year, according to a World Bank report released recently. The report says Bangladesh could save between \$200 million and \$800 million per year, about 0.7 to 3.0% of its gross national product, if air pollution in the country's four major cities was reduced. The report adds that 6.5 million people in those cities suffer each year. Vehicular air pollution is a major cause of respiratory distress in urban Bangladesh. According to the National Institute of Diseases of Chest and Hospital (NIDCH), nearly seven million people in Bangladesh suffer from asthma, more than half of them are children. Air pollution kills an estimated 2.7 to 3.0 million people every year throughout the world, and 6% of all annual deaths. About 9 deaths in every 10 due to air pollution take place in the developing world, where about 80% of all people live. In 1995, the average ozone concentration in Mexico City was about 0.15 parts per million, 10 times the natural atmospheric concentration and twice the maximum permitted in Japan or the US. The density of lead in the air of Dhaka is 463 nanograms per cubic metre, which is ten times more than the acceptable standard and several times more than the aforementioned cities, even than the most polluted city of Mexico. The level of lead poisoning is a major factor responsible for decreasing the mental abilities of the children as a result of which the country will have acute shortage of intellectuals in the long run. Let us make all possible steps to make people understand the environmental situation of the country and make them swear to vote for those who will swear to save the environment of our country for us as well as for our next generations. The only way to enhance the ethical accountability of public administration is that Bangladesh Government should immediately translate its National Environmental Policy, transport policy into action to benefit the people of this country.

Key words: Air pollution, governmental measures, Bangladeshi.

INTRODUCTION

Air Pollution is one of the most challenging problems facing by the international community is widespread and growing in importance and has clear and known impacts on health and the environment. The human need for transport, manufactured goods and services brings with it

impacts on the atmospheric environment at scales from the local to the global. The rate of development of the global economy brings new pressures and the willingness of governments to regulate air pollution is often balanced by concerns over the economic impact of such regulation.

Science is the key to identifying the nature and scale of air pollution impacts and is essential in the formulation of policies for regulatory decision-making. Continuous improvements in our knowledge of the fundamental science of air pollution and its application are necessary if we are to predict, assess and mitigate the air pollution implications to local, regional, national and international economic systems (Brebba and Longhurst, 2010).

The problem

Air pollution kills 15,000 Bangladeshis each year, according to Paul Martin (a bank environmental specialist) in Dhaka 2001 a World Bank report released. The report says Bangladesh could save between \$200 million and \$800 million per year, about 0.7 to 3.0% of its gross national product, if air pollution in the country's four major cities was reduced (South Asia, 2001).

The large number of children, street children, local streetwalker, and rickshaw puller in Dhaka City pose a definite threat to this air pollution. Young children are mostly exposed to cadmium (Cd) through inhalation of smokes and contaminated soils and dust from industrial emissions and sewage sludge. The high lead (Pb) in the environment from gasoline, paints, ceramics, batteries, etc., has also been factor to increase the risk of polluted air (Wahed et al., 1999). A study found that Blood lead levels were very high and at toxic levels in children presenting with psychomotor delay and behavioral problems, indicating lead poisoning (Khan et al., 1999).

A report adds that 6.5 million people in those cities suffer each year at least 8.5 million cases of minor illnesses not requiring treatment. And the major disease in Bangladesh is not diarrhea, as is the general perception, but is the acute respiratory infections caused mainly by the polluted air (South Asia, 2001).

According to the Department of Environment (DOE), the density of airborne particulate matter (PM) reaches 463 micrograms per cubic meter (mcm) in the city during December to March period, the highest level in the world. Mexico City and Mumbai follow Dhaka with 383 and 360 mcm respectively (Daily Star, 2009). Automobiles (auto rickshaws, trucks and buses, some 35% is related to fine particulate matter and 48% to hydrocarbon mainly generated by vehicles with two stroke engines (using a direct mix of Mobil and petrol), particularly by baby taxis, tempos and motor cycles), industrial emissions, bad civic practices and poor government services are some of the factors causing Bangladesh's polluted air (Ahmed et al., 2002).

The pollution-vomiting vehicles (20 to 25 years old vehicles) are now again on the high roads. Many owners have changed bodies of their old buses and also tinted but the engines are the same. These unfit buses are creating traffic jam and making the air polluted by blowing up black smokes, causing serious health hazards to the commuters (New Nation, 2010b). However it is a more

complex problem than reducing Polly bags (Independent, 2002). Recently, the government has decided to launch a drive in Dhaka city from July 15, 2010 to remove 25 years old buses, minibuses and trucks from the street as one of the measures to ease the nagging traffic congestion (Daily Star, 2010a). This drive mainly aimed at solving traffic jam and checking environment pollution (The New Age, 2010) and certainly this will particularly help to reduce air pollution in the city as well.

NGOs' and Bangladesh Government's involvement

NGO named, BAPA (Bangladesh Poribesh-Dhuron Andolon- Bangladesh Environmental Improvement Organization), work for a better Bangladesh, Bangladesh Environmental Society (BES) and many others are working very hard individually or in collaboration with each other to remove air quality problem by arranging seminars, organizing rallies, writing papers, creating awareness on air pollution, and doing research on how to reduce air pollution.

The Bangladesh Government successfully concluded negotiations with the World Bank for US\$62.20 million Clean Air and Sustainable Environment (CASE) project. CASE is an innovatively designed project that aims at integrating environment and transport concerns towards a common objective of improving Dhaka's air quality. Air pollution is a leading cause of mortality and morbidity in Bangladesh.

The project will primarily cover two key air pollutant sectors – brick construction and transportation. The environment component of the project would help the Department of Environment to improve overall air quality management capacity, and to introduce cleaner technologies to improve energy efficiency and reduce air emissions in the brick making sector (World Bank, 2009). Department of Environment (DOE) is working to revise the brick burning act by mid 2011 through stakeholder consultations and review of the regional experience. DOE has also been taking measures to strengthen its newly established Air Quality Cell (AQC) for better air quality management (Holiday, 2010). However, the bank gave Bangladesh \$4.7 million in July 2000 to fund an air quality management project. It also supported a program to train drivers how to reduce emissions (South Asia, 2001).

Department of Environment (DOE) recently signed an agreement with Norwegian institute of Air Research (NILU), under which Bangladesh will receive 1.3 million US dollars grant for air quality and research. The grant will be utilized for aid quality monitoring across the country, first ever study on country's present air quality impact on health, inventorying the sectoral emission and green house gases (GHGs), air quality modeling and development of an air quality forecasting system (News Today, 2010).

It is the moral duty to protect the people from any kind of health related problems. Not paying attention to these



Figure 1. Air pollution in the developed countries.
(Source: <http://www.infoforhealth.org/pr/m15/m15chap2.shtml>).

issues results in grief and it leads to death in some cases.

METHODOLOGY

A systematic review was conducted from 1994 to 2010. Information was retrieved from documents available mainly in electronic database and on the websites of specialized agencies, using the terms Air pollution and Bangladesh with other researchers work was undertaken, including 4 leading Bangladesh daily newspapers also analyzed 37 documents were retrieved from the database (websites) of several national and international agencies were browsed. The most important, being online collection from different sources on air pollution related issues. These sites housed a number of reports on quantitative and qualitative studies, estimates of air pollution cases, policy analysis of the existing air pollution situation in developing countries, developed countries, and government strategies. Histological observations were carried out and a cross-sectional prevalence study of air pollution was also held. A scrutiny of the abstract revealed that some presentation posted on the websites, which was presented in international conferences and few other presentations were published in journals. Collected documents were skim read to cases, whether they contained information on air pollution in conjunction with Bangladesh.

HISTORY OF AIR POLLUTION

Humans' first experienced harm from air pollution when they built fires in poorly ventilated caves. Ever since then humans continue to pollute more of the earth's surface. Until recently, environmental pollution problems have been local and minor because of the Earth's own ability to absorb and purify minor quantities of pollutants. The industrialization of society, the introduction of motorized vehicles, and the explosion of the population are factors

contributing toward the growing air pollution problem (Tom, 2007).

DEFINITION OF AIR

A mixture of gases (especially oxygen) required for breathing, is the stuff that the wind consists of (WordNet, 2006). Air is indispensable for the survival of all living organisms on earth, including human beings. It is even more important than water, without water a person can survive for days, but without air, no more than a couple of minutes (UNEP, 2001).

DEFINITION OF AIR POLLUTION

A condition of the air, that endangers the health, safety, or welfare of persons, interferes with normal enjoyment of life or property, endangers the health of animal life or causes damage to plant life or property (Government of Alberta, 2004).

AIR POLLUTION IN THE DEVELOPED COUNTRIES

According to a source air pollution from cars, trucks and other sources is killing more people globally than traffic crashes (The Nation Health, 2001) (Figure 1). More than 75% of all people in the developed countries now live in cities, which is a 60% increase since 1950. For developing countries this rate is even faster, with twice as many people now living in urban areas, as did 50 years ago. It does not matter where people lives: New York, Houston, Toronto, Sydney, or hundreds of other cities,



Figure 2. Air pollution in the developing countries.
D. Hinrichsen (Source: <http://www.inforforhealth.org/pr/m15/m15chap2.shtml>).

breathing dirty air has become a common fact of life. The haze of pollution is spread all over the place. The inmates are bustling through the polluted haze, hardly knowing anything about the poison they are inhaling (Islam, 2002).

An estimated 2.7 to 3.0 million people every year (annually around 6% of all deaths) dies due to air pollution according to Population Reports. The source also mentioned deaths caused by air pollution in Brazil, Sao Paulo, Mexico city and New York City. Researcher anticipated that adopting green gas mitigation methods, which are currently available, would save 64,000 lives in these cities during the next twenty years. This dangerous attack would also stop 65,000 cases of bronchitis and save about 37 million days of restricted or lost work (Population Reports, 2000).

Although argument about energy options, long term climate change impacts, and the ability to adapt to those impacts go on with the progress, there is small reservation that air pollution from current patterns of fossil-fuel use for electricity generation, transport, industry and housing are already killings millions through out the humankind (The Nation Health, 2001).

Research team researched ozone, particulate, carbon dioxide and other pollutants from the combustion of fossil fuels, which create the so-called greenhouse, affect the climate in coming decades. These pollutants also cause of premature death from asthma, heart disease and lung disorders (The Nation Health, 2001).

In the past, air pollution research found that reducing emissions from older, coal-fired power plants in the United States would avoid 18700 deaths, 3 million lost days and 16 million restricted activity days each year. One research showed that reducing emission from nine older coal plants in the Midwest would prevent 300

deaths (yearly), 2000 respiratory and cardiac hospital admissions, 10,000 asthma attacks and 400000 days of respiratory symptoms. In current research, investigator alleged reducing air pollutants could bring even more public health benefits that they did not chart (The Nation Health, 2001).

Another influential minor pollutant is acid rain, created when sulfur dioxide and oxides of nitrogen combine with water vapor and oxygen in the existence of sunlight to form a watery "soup" of sulfuric and nitric acids. They can fall as either wet (acid rain) or dry deposition. Other damaging pollutants comprise sulfur dioxide, suspended particulate matter (soot, ash, and smoke from fires), carbon monoxide from vehicle exhausts, and lead, mostly from the exhaust of vehicles that burn leaded gasoline (Population Reports, 2002).

AIR POLLUTION IN THE DEVELOPING COUNTRIES

“In many developing countries, atmospheric pollution is a serious hazard, responsible for at least 2 million deaths annually. Curbing outdoor and indoor air pollution would improve health substantially” (Figure 2).

2.2 million children die of respiratory infection associated with indoor air pollution a year in developing countries. In the developing countries, about 9 deaths in every 10 due to air pollution take place, where about 80% of all people live. Again only in Asian countries (out of this 2.7 million), more than 1.6 million die. Almost all in developing countries (About 2.5 billion people) suffer from high levels of indoor air pollution, reason is burning wood, animal dung, crop residues, and coal for cooking and heating are women and girls are the sufferers of

indoor pollution, whose primary responsibility is cooking and looking after the house. In contrast, mostly in cities outdoor air pollution harms 1.1+ billion people (Population Reports, 2000).

Smelters Lead pots, and pipes are typically held accountable by the specialist for loss of intelligence among children and for brain damage and unusual behavior among grown persons. Heavy metals released into the environment emerge from uncontrolled emissions by metal smelters and other industrial activities, unsafe disposal of industrial wastes and lead in water pipes, paint, and gasoline. These heavy metals are most dangerous to human health (lead, mercury, cadmium, arsenic, copper, zinc, and chromium). These metals are occurring naturally in the soil in trace amounts, which create several harms. When concentrated in particular areas, they present a serious danger. Arsenic and cadmium can be the source cancer. Mercury can be the cause of mutations and genetic damage, and copper, lead, and mercury can be the cause of brain and bone damage (The Nation Health, 2001).

Lead additives in gasoline cause well-known health problems. In Thailand, in 1990 a survey established that some 70,000 children in Bangkok risked losing more than four points of IQ because they were largely exposed to lead emissions from vehicles. In Latin America, some 15 million children (less than two years) are at risk of health troubles from lead pollution. In 1970 United States Leaded gasoline began to be phased out after clean Air Act. It was not up until eighties, the European Community followed suit. Elsewhere, such as Bangladesh, leaded gasoline continues to be used widely (The Nation Health, 2001). As a result, high levels of pollution impair photosynthesis, air pollution is also reduces food production and timber harvests. In Germany, in a year 4.7 billion dollar (US\$) is lost in agricultural production to high amount of sulfur, nitrogen oxides, and ozone (Population Reports, 2000).

In developing countries, the World Health Organization estimates that annually about 700,000 deaths could be prevented if three major atmospheric pollutants carbon monoxide, suspended particulate matter, and lead were brought down to safer point. In 1995, in developing countries the health expenditure of urban air pollution was estimated almost US\$100 billion a year. Around US\$40 billion accounted for chronic bronchitis (The Nation Health, 2001).

Millions of people are at risk from air pollution in cities where pollution control is not stringent. Bangkok, Dhaka, Manila, Mexico City, and New Delhi, which are one of the Densely populated and rapidly growing cities in the world, are often entombed with air pollution from trucks, taxi, and motorcars and from uncontrolled industrial discharge. In 1995, in Mexico City the standard ozone concentration was about 0.15 parts per million, ppm, which are 10 times the natural atmospheric concentration and also twice the maximum permitted in Japan and or the United States of

America (Population Reports, 2002).

Affects of Living with polluted air

Swedish researchers gave details that deadly heart attacks may be more expected among people who spend decades living in heavily polluted areas. While there was no connection between people's exposure to various pollutants over a 30-year period and overall heart attack risk, such exposure did appear to be linked with a greater risk of deadly heart attack, especially heart attacks occurring outside hospitals, Mats Rosenlund of the Stockholm County Council and colleagues report (Daily Star, 2006).

The researchers also established that people who had ever lived in pollution "hot spots" with particularly dirty air had a 23% increased risk of heart attack, and a 40% increased risk of fatal heart attack. The health effects of short-term exposure to air pollution are fairly well understood, but it is much less clear how long-term pollution exposure affects health, Rosenlund and associates point out in the journal *Epidemiology* (Daily Star, 2006).

Pollution exposure could add to heart attack risk by causing chronic inflammation, speeding the progression of arteriosclerosis (hardening of the coronary arteries) and altering heart function, they note. To investigate, they reviewed information on pollution exposure for 1,397 men and women living in Stockholm County who had suffered heart attacks for the first time between 1992 and 1994 and 1,870 healthy controls. The researchers estimated carbon monoxide, sulfur dioxide, particulate matter and nitrogen dioxide exposure by linking an individual's address to historical data on emissions and atmospheric dispersion of the pollutants. Overall, there was no link between pollution exposure and heart attack risk. However, the risk of fatal heart attacks appeared to have some association with pollution exposure, especially among people who died outside the hospital (Daily Star, 2006).

AIR POLLUTION IN BANGLADESH

Bangladesh is one of the least developed nations in the world. Since it's beginning (1971), there has been some growth in the industrial sector. Industries are mainly concentrated in major urban metropolitan areas such as Dhaka (The capital of Bangladesh), Rajshahi, the seaport cities such as Chittagong and Khulna, the inland port city Narayanganj, and other divisional towns. Obviously, the air pollution problem is more severe in these areas. Apart from unplanned industrial development in these areas, the severity of the pollution is increased mainly due to exhausts from two-stroke engine and diesel-run vehicles. In the rural areas of Bangladesh, the danger of air

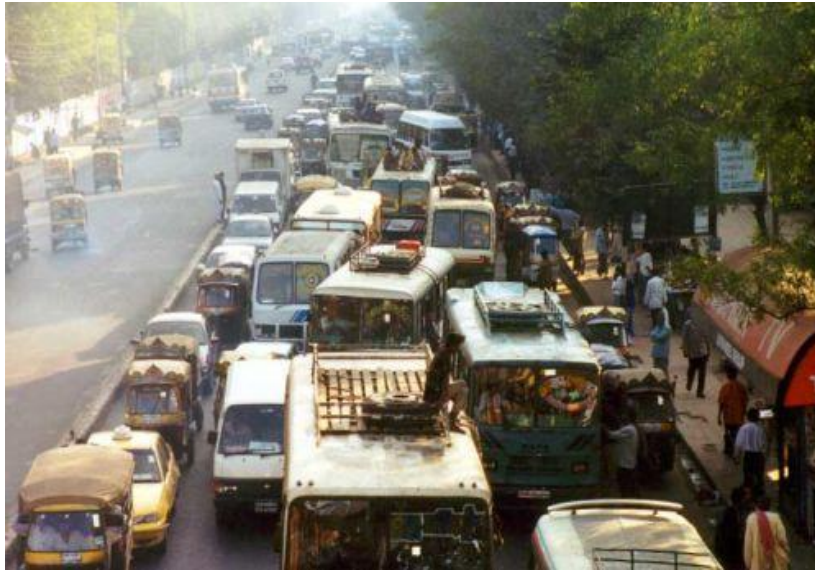


Figure 3. Air pollution in Bangladesh.
Traffic in Dhaka (Source: <http://gallery.bangla.ca/dhaka/traffickingdhaka>).

pollution not yet turns into a point of concern. This is due to less motorized vehicles and industries in rural areas. (UNEP, 2001) (Figure 3).

Vehicular air pollution is a major cause of respiratory distress in urban Bangladesh. If pregnant mothers come across excessive pollution, it may cause premature death of their children. According to the National Institute of Diseases of Chest and Hospital (NIDCH), nearly seven million people in Bangladesh suffer from asthma, more than half of them are children. Cases of children suffering from bronchitis and chronic cough have also shot up in recent years. Children breathe more air relative to their lung size than adults. They spend more time outdoors, often during midday and afternoons when pollution levels are generally highest (Daily Star, 2009).

The primary sources of air pollution in the rural areas are brick kilns and cooking stoves. In rural areas, wood, coal, and biomass are used as sources of energy. During the monsoon, rural people cook inside their houses without sufficient ventilation (exposure to air) systems. This provides rise to severe indoor air pollution, which brings health hazards, mostly for women and children (UNEP, 2001).

There are two major sources of air pollution in Bangladesh, vehicular emissions, and industrial emissions. These are mainly concentrated in the cities. Other than those there are many brick-making kilns operated seasonally, mainly in dry season all over Bangladesh. More or less all of these kilns use coal and wood as their prime sources of energy, resulting in the emission of particulate matter, oxides of sulfur, and volatile organic compounds. Additionally to these usual sources of fuel, used rubber wheels of vehicles are also

burnt, which produce black carbon and toxic gases. These are harmful for health (UNEP, 2001).

In order to accommodate the growing population, the construction of high-rise buildings is growing rapidly. Along with these buildings, the numbers of slums are also growing. The tremendous force of population has made it almost unfeasible to maintain a clean environment in the capital city of Dhaka (UNEP, 2001).

Dhaka has been identified as the second worst city to live for the second consecutive time, according to a survey of Economist Intelligence Unit (EIU) affiliated with the UK-based weekly Economist. The listing was based on 30 factors across five broad categories: stability, healthcare, culture and environment, education and infrastructure. The survey factor were rated as accepted, tolerable, uncomfortable, undesirable or intolerable in a system that "allows for direct comparison between locations," according to the report (Daily Star, 2011). Dhaka is also one of the most densely populated cities in the world (UNEP, 2001). Dhaka, the capital city of Bangladesh (location 23.42 N and 90.22 E) has an estimated population of more than 8 million. Air pollution has emerged as an acute problem in the city. Blackening of the city air and reduced visibility can be observed in some areas at times even. Occurrence of choking smells and irritating eyes are common (Khaliquzzaman, 1998).

Cost of lead pollution

1 $\mu\text{g}/\text{m}^3$ of air Pb (lead) corresponds to 1-point decrease in IQ. Current level of blood Pb concentration in adults in Dhaka is $\sim 50 \mu\text{g}/\text{dl}$.

Table 1. Types of air pollution.

Gaseous substances	Gases, vapors SO _x , NO _x , CO, Ozone, NH ₃
Particulate matter	Dust, fly ash, smoke, shoot, droplets, mist, fog, fumes, aerosol

(Khaliqzaman, 1998).

Cost involvement for 1 µg/dl increment of blood lead in Dhaka is ~US\$ 8.33 million per year (Method of calculation is linear scaling by population and per capita GDP). Component costs for children includes medical cost, infant mortality, neonatal cost and supplementary cost, and for adults include medical cost, earning loss and mortality. (Bangladesh Studies Pollution Levels 1996; Khaliqzaman, 1998).

Pb (lead) in Bangladesh gasoline

Eastern Refinery processes Arabian Light Crude, which lacks branch chain or cyclic hydrocarbon. It is a small skimming refinery, which perform crude distillation. Gasoline produced has low octane number. Lead based additives are used to increase octane number. One of most common additives is Tetraethyl lead (TEL). TEL is 100% imported (Bangladesh Studies Pollution Levels 1996; Khaliqzaman, 1998).

Only old technology automobiles (typically pre 1980 models) with soft valve seats need some Pb for lubrication in order to avoid valve recession. A lead level of ~0.02 to 0.05 g/l is sufficient for this. This also can be replaced by adding lubricants to unleaded gasoline. Cost of lubricant additives is ~0.3 cents (Bangladesh Studies Pollution Levels, 1996; Khaliqzaman, 1998).

Statistics

Even in Bangladesh, air pollution from cars, trucks and other sources is killing more people than traffic crashes. According to the official statistics by Bangladesh Police Head Quarters, there were about 4000 fatalities only from Road traffic accident in 2000. An estimate shows that in 2000 there were 3970 number of accidents causing 4046 numbers of fatalities estimating 2270 number of injuries and 162.9 deaths per 10000 vehicles (WHO, 2003).

The Street side Suspended Particulate Matter (SPM) trends are highest during the dry season (December to March) due to increase in roadway dust (dust from dust-carrying vehicles), and increased open burning (John, 1998). According to Khaliqzaman, a chief scientific officer of Bangladesh Atomic Energy Commission (BAEC), with levels falling during periods of medium and heavy rainfall. Khaliqzaman attributed the high lead levels to the use of leaded fuel in vehicles. He said that lead poses a public health danger, especially to children,

by penetrating the lungs and entering the blood stream, and can lead to impaired intelligence (Bangladesh Studies Pollution Levels, 1996; Khaliqzaman, 1998).

The concentration of particulate matter and lead, carbon monoxide and hydrocarbon in the air of Dhaka City (capital of Bangladesh) is much above the standard level and is probably the highest in the world and also one of the more cancer inducing cities of the world. The lead content of dust in Dhaka City was determined by Atomic Absorption Spectrophotometer (AAS). Lead content of dust ranged from 7 to 240 parts per million, ppm, which is ten times more than the standard level and several times more than the aforementioned cities, even than 'The most polluted city-Mexico.' The highest amount of lead was found in the dust collected from Syedabad (a town inside the Dhaka city) and the lowest was found at Dhaka University bus depot (Rahman, 2002).

The Bangladeshi standard for the level of suspended particulate matter (air pollutant) in the residential areas is 200 micro gram per cubic meter. However, the level touched 2000 mg/m³ in different parts of the city mentioned by Save Environment Movement chairman in a workshop. He also mentioned that average dust concentration in the air of the capital varies from 1000 to 1200 mg/m³ which is five to six times higher than the Bangladeshi standard and seven to eight times higher than the WHO standard. WHO sets SPM level in the commercial at 120 mg/m³, he added. He also said 'Road digging, plying of uncovered sand-laden trucks and keeping construction materials open on the roadsides are the major causes of dust in the city, which are responsible for severe air pollution, posing health hazards to the city dwellers' (New Nation, 2010a) (Tables 1, 2 and 3).

Effects of pollution heightens in Dhaka

A new child-attacking virus thrives in Dhaka as pollution heightens. According to the WHO report 2001, the lead concentration found in the blood of children in Dhaka was up to four times higher the acceptable level of 10 µg/dl (Enrico, 2008). This high level of lead concentration in blood is correlated with that in the air (E-mela, 2002). This new variant of virus has been hitting small children of Dhaka with debilitating effect attacking their breathing problem. The school children of Dhaka City had nasal irritation, cough when they caught by cold, headache, dizziness. The reason behind is the high lead in the environment from gasoline, ceramics, batteries, paints,

Table 2. Gaseous pollutants in Dhaka Air.

SO ₂	NO ₂	CO	HC	O ₃
64-143 ug/m ³	25-32 ug/m ³	Insufficient data	No data	No data
Collected at Tezgaon	Collected at Farmgate	-	-	-

(Khaliqzaman, 1998).

Table 3. Lead dispersion and lead in gasoline in Dhaka.

Year	Pb in gasoline	Total lead dispersion (tons)
1994	0.4 ng/l	50
1998	0.1 g/l	50

Comment: Situation has not possibly worsened in Dhaka since 1994. (Bangladesh studies pollution levels 1996; Khaliqzaman, 1998). Dhaka Air Pollution by Medical Information Group (MIG), Dhaka, Bangladesh, <http://www.angelfire.com/ak/medinet/dhakutp.html>.

etc. Young children are mostly exposed to cadmium through inhalation of smokes and contaminated soils and dust from industrial emissions and sewage sludge. The children have in most cases been given antibiotic that is not useful in combating viral infections. However, what is alarming is that the medical community appears unprepared and unequipped to deal with this new viral strain and some medical experts have blamed it on the high level of urban pollution (Bangladesh Observer, 2002).

Corruption in importing CNG-run three wheeler vehicles

In January 7, 2004, four-member sub committee headed by the present Government lawmaker formed to probe into the alleged corruption in the Communication ministry. More than two years have elapsed since the committees are formed, but the committees failed to submit probe reports till now (Independent, 2006a).

DISCUSSION

In developing countries, such as Bangladesh, the old fatal diseases are still persistent -tuberculosis, malaria and diarrhoeal disease, and now HIV/AIDS has just entered to our country. And joining with these diseases, as vital reason of death and ill health are cancers, destroy bones, livers, lung, kidney and chronic diseases (such as Bronchitis, gastrointestinal disorders, breathing problem, anemia, insomnia, weight loss, bronchial asthma, pulmonary oedema, cough, muscle paralysis, nephropathy, respiratory infection etc.) affected by industrial and agricultural chemicals and other pollutants in the atmosphere, soil and water (Population Reports,

2000) (Figure 4).

Lead, copper, mercury, arsenic and heavy metals, which are used in industry, are the source of numerous deaths. A number of pesticides and other chemicals, named as persistent organic pollutants (POPs) that are used both in agriculture and in industry are the cause of cancer and genetic abnormalities in human being (Population Reports, 2000).

Dhaka City corporation (DCC) role

It was recently revealed in a review meeting by the DCC, the nodal agency entrusted abysmally. Accordingly, the World Bank representative's strongly commented ever to be passed by officials of an international organization on the DCC has high lighted the letter's failure on no unmistakable terms (Azra, 2006).

It had no coordination with Dhaka Metropolitan Police (DMP) or Government office of land development (Razdhani unnan kortipokho, Razuk), even on a special purpose such as handling such a must-do project. Although its corrupt and inefficient official's concerned flamboyantly move around sporting a can do posture all the while. That the DCC has drawn a flak for its inherent lack of expertise in implementing a project of international stranded is some thing that must also be taken very seriously by all concerned. Hopefully, the project will be completed under a double -quick basis under the new arrangements/ ministry (Azra, 2006).

Other countries activities

In Asia, Beijing can be modal city to imitate. They have launched a nine-month campaign starting from April 2002 top reduce air pollution. They are mainly focusing on reducing suspended particles and discharge of



Figure 4. Dhaka City vs. Vehicles.

Source: (<http://www.thedailystar.net/newDesign/news-details.php?nid=169290>)

contaminants by a big margin. At the same time within six months they will finish renovation on 1500 coal fired boilers to reduce 24000 tons of pollution. Motor vehicles used for over 10 years and taxis of more than 5 years old are going to be carefully examined. If the vehicles do not abide by the waste release standard, then no matter how new they are, they will be forced to stop (Islam, 2002).

Beijing is also planning to remove about 40 factories situated near city. To get very quick results they are going to transform a 4 million square meters of unused land into pollution-free zone. And to the common people to share their views, Beijing introduced new telephone lines for this purpose so that they can easily hear the opinions from the community (Islam, 2002).

In India vehicles were converted into CNG in the capital city Delhi by court order. India banned 8 year old vehicle and those condemned ones were being imported to Bangladesh (Azra, 2002). Recently, Eco- friendly battery operated rickshaws hit the Delhi roads as part of the green initiative of the Delhi government ahead of the Commonwealth Games. Sponsored by telecom major Vodafone the E-rick costs about Rs 1.5 and initially it will be operative in select localities of the Capital. "There is a need for collaborative efforts to make Delhi a pollution-free zone. We have always been conscious about environmental issues and hence are supportive of such initiative which would help ensure a healthier and greener city," Delhi Chief Minister Sheila Dikshit said after launching the E-rick. (i Government, 2010).

Already Hong Kong is thinking of using extensive rail transport, thus minimizing the growth of diesel and petrol vehicles (Islam, 2002).

Future directions

Air pollution is not only causing serious health problem but also imposing huge social cost (Fahmida Akter Khatun, 2002). The cost of living in Dhaka is being seriously increased by this hazard and on top the medical management facilities are not adequate. It seems dying in Dhaka is becoming a long stretched out business, which we can barely afford (Bangladesh Observer, 2002). Such a problem needs immediate attention from the policy makers as the existence of human being depend on the solution of the problem (Fahmida Aker Khatun, 2002). As we came to know that lead emissions from motor vehicles is the primary element for declining the IQ level of the children as such the country will have acute shortage of high-brow in the coming future.

Lead poisoning may be more far-reaching for malnourished children from lower income public, who are close to heavy traffic (Khan et al., 1999). What we foresee, after 10 years from now, our young children would not be able to smell what their mother would be cooking, and rather they will be inhaling and exhaling only polluted air. One has to remember that the arrogant roar of an engine can easily drown the crying of a child.

RECOMMENDATIONS

People have been crying out for solution for decades but nothing has yet been done. The atmosphere is under increasing pressure from green house gases that threaten to change the climate and from chemicals that

reduce the ozone layer. 'The major air pollutants effecting respiratory tract are sulfur dioxide, photochemical oxidant, ozone and NO₂' (Ahmed et al., 2002).

The following stringent measures can be adopted by Government of Bangladesh to save the huge amount by making the atmosphere environment-friendly:

1. Take the lead in managing this disastrous situation.
2. Promote national energy efficiency and emission standards and develop efficient, cost effective, and less polluting mass transit systems.
3. Completely abolish on importing and use of leaded gasoline.
4. Completely abolish on 2 stroke engine vehicles.
5. Completely abolish on (which are more than 20 years) old vehicles.
6. Correct use of lubricants can reduce the emission levels.
7. Encourage people to use Compressed Natural Gas (CNG) or Liquid Petroleum Gas (LPG), Rechargeable Battery (recently being used by US) driven car.
8. Immediately scratching out of all unfit vehicles and would be punish if they drive all those kind of vehicles on the streets.
9. Every vehicle's (government and non government) should submit to emission test and get inspected by every year.
10. Immediate relocate/ shift the Industries (such as Tanneries, Battery, Pharmaceutical, Tobacco) away from Dhaka city.
11. Training for the Doctors and treatment facilities for the patients are required.
12. General Training should be held quarterly to train the drivers how to reduce emissions.
13. Seminar/ National and International Conference should be held yearly.
14. Industrial wastage should be properly disposed.
15. Create Public awareness on Air pollution through media materials (such as videos, pamphlets, booklets, radio and television including print and electronic media, film and the arts, and new media technologies).
16. Modernize exiting power systems.
17. By reducing fossil -fuel combustion.
18. The United Nations framework Convection on Air pollution should be implemented in our country. Within this framework a National level commission along with NGO's should be formed to combat this situation.
19. UN Environment Program, UNEP should open a technical office, specializing in air pollution in Dhaka as they open in Kathmandu, Nepal.
20. We need to save the forest and promote plantation inside the cities to maintain or restore the ecological balance.
21. Along with the private sectors, we can take discrete initiatives to replace old and small vehicles and introduce new big capacity vehicles. Less the number of cars, less the pollution, this should be kept in the mind.

22. Cars on the streets of the capital can move according to their license plates on particular days.

23. Lastly we need 'Strong Political will' to save our environment.

Dhaka's transport situation is crisis without end. At the heart of the matter, it is mostly about management (Public Administration), a general problem of systematic failure. While sticking to phase out program government should assist rehabilitation of the affected (Azra, 2002).

There is a talk of the CNG-fixation of the two-stroke engines. Government should issue an order dating CNG conversion of all vehicles within a set time frame and begin with its own fleet and those belonging to Ministers and also MPs who import tax-free cars. Government as understood has a plan to expand CNG use (Azra, 2002).

Government should strengthen regulations and enforcement. Measures to decrease fuel demand and improve traffic conditions, unworthy road conditions, toll collection and other issues of non-accountability are also critical to ensuring a net emission reduction and should be used as a complement to technical measures (Xie, 1998). In order to safeguard public health, biodiversity and ecosystems, sustainable environmental management needs to be guaranteed (Islam, 2006). As a part of country's environmental management, air quality monitoring activities is needs to be expanded to the major cities such as Chittagong, Rajshahi, Khulna, Barisal, Sylhet and Narayangonj. The state of air pollution is not environmental problem or hazard, rather it is a governance disaster. And there is something deeply tragic about the process of demand articulation by civil society leaders through various forum and dialogue and denials by the powers that be (Azra, 2002).

Let the Bangladeshis cry against the pillage of the government, and at the same time the government will pay heed to these and quickly turnaround drawing on the wealth of various expert advices coming through newsprints, journals and elsewhere on the burning issue of air pollution, which, is a sign of failed governance (Azra, 2002).

In spite of the recent successful withdrawal of the most polluting three-wheelers from Dhaka's metropolitan areas. There is an urgent need to take follow-up steps for similar withdrawal or decommissioning of aged buses and trucks that seem to be eluding official instructions through repainting to look younger and managing papers from the Bangladesh Road Transport Authority (BRTA) to the effect that they are still roadworthy. It was established after expert study that Japanese reconditioned cars pollute far less compared to even brand new imported cars from India. Therefore, government needs to take its decision in respect of import of new and reconditioned cars in light of this study to favor the environment (Financial Express, 2006).

The government of Bangladesh to formulate special policy to contain the steady increase in dust

concentration in the city and to instruct all the authorities concerned to take strong measures to follow the respective rules while constructing building, digging roads and sweeping the roads.

Severe air pollution is threatening public health in the Dhaka City, Due to the excessive dust in Dhaka's air, people are falling victim to different complex diseases, including tuberculosis, asthma, respiratory complications, bronchitis and other skin diseases. Sweeping of the city roads during daytime is another reason for increase in dust.

According to the city corporation rules, garbage collection and its disposal should be done before 8:00 am but the rule is not duly followed (New Nation, 2010a).

The only way to enhance the accountability of public administration is Bangladesh Government should immediately translate its National Environmental Policy, transport policy into action to benefit the people of this country. Other wise this country will be in limbo.

NOTES

There are a number of sources for current information on the crisis. See Dhaka Effect on Dhaka air quality by two strokes engines and suggested remedies. Paper presented by Uttara Motors Ltd. in a Consultative Meeting on Integrated Approach to Vehicular Pollution Control held during April 26-27, 1998 in Dhaka; Air Pollution in Dhaka, Bangladesh, <http://www.eng-consult.com/air/air.htm>; Urban air pollution: a Bangladesh perspective, 2005 WIT Transactions on Ecology and the Environment, Vol 82, by M. Habibur Rahman1 & A. Al-Muyeed: Impact Analysis of Brick Kilns on the Air Quality in Dhaka, Bangladesh, by Dr. Sarath Guttikunda, May, 2009, SIM-air Working Paper Series: 21-2009, www.sim-air.org, www.urbanemissions.info

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