

# Dhaka's toxic air: A major public health concern



MD KHALEQUZZAMAN

THE electronic and press media in Bangladesh has recently been highlighting the findings of the 2018 World Air Quality Report published by Greenpeace and AirVisual. As per this report, Bangladesh has the most polluted air in the world, and Dhaka is the second most polluted capital city.

An Air Quality Index (AQI) is a summary scorecard that effectively describes ambient air quality relative to the relevant air quality standards, consisting of several parameters such as sulphur dioxide, nitrogen dioxide, carbon monoxide, ozone, and particulate matters (PM2.5 and PM10). An AQI score of 50 is considered good, while a score of over 250 is considered hazardous. The US embassy's continuous air quality monitoring system reported the AQI in Dhaka to be 244 on March 7, 2019. The AQI values between 201 and 300 trigger a health alert, meaning everyone may experience more serious health effects.

Most of the time, the AQI focuses on fine ambient airborne particulate matters (PM2.5) present in the air as a measure of air pollution. Due to their small size, PM2.5 is able to penetrate deep into the human respiratory system, and from there to the entire body, causing a wide range of short- and long-term health effects. Besides, these small dust particles can act as a conduit for disease-carrying germs and toxic metals that are available in the environment both from natural and anthropogenic sources.

In an attempt to investigate the concentrations of toxic metals present in road dust, household dust, and on roadside tree leaves, I collected a total of nine samples in December 2017 from Mirpur DOHS, Curzon Hall and Shahidullah Hall of Dhaka University, (tree leaves from) Dhanmondi Road 15, Mohammadpur Town Hall, Jigatola Bus Stop, Banglabazar, Rayerbagh Bus Stop, and (indoor household dust from) Rayerbagh in Dhaka city. The samples were processed and analysed for elemental composition using an Olympia hand-held XRF device at Lock Haven University, USA. The amount of chromium, mercury, lead, copper, nickel, manganese, silver,

arsenic, iron, zinc, rubidium, strontium, zirconium, molybdenum, and sulphur was determined in mg/kg. If inhaled or ingested in high amounts, many of these metals can cause serious illness and health effects. For instance, lead accumulates in body organs (i.e. brain), which may lead to poisoning or even death. The gastrointestinal tract, kidneys, and central nervous system are also affected by the presence of lead. Children exposed to lead are at risk of impaired development, lower IQ, shortened

include, but are not limited to, brick kilns, tanneries, disposal of high-metal waste, leaded gasoline, lead-based paints, fertilisers, animal manure, sewage sludge, compost, pesticides, coal combustion residues, mine tailings, petrochemicals, and atmospheric deposition. There are no set standards for an "acceptable amount" of these toxic metals in air, because it is expected that the air that humans breathe is free of these elements. However, since these toxic metals can cause

(459), and sulphur (130). The results showed that 9 out of 9 samples exceeded the USGS-EPA standards for MAC for chromium. The highest concentration was found in dust collected from Shahidullah Hall at 537.33 mg/kg. Five out of nine samples exceeded the MAC for mercury, while four out of nine samples exceeded the MAC for lead. The highest concentrations of mercury (3.53 mg/kg) and lead (212 mg/kg) were measured at Banglabazar. Four out of nine samples

showed concentration of silver exceeding MAC levels, with the highest value of 19.66 mg/kg for the sample collected at Curzon Hall. From the results of dust analysis, it is obvious that particulate matters in Dhaka city have very high toxic metal concentrations, making the air unsafe to breathe.

As per a World Bank report, 234,000 people died, including 80,000 in urban areas, in 2015 in Bangladesh due to environmental pollution (*The Daily Star*, September 17, 2018). The same report indicated that some 18,000 lives and 578,000 years of potential life were lost in Dhaka city in 2015. Unfortunately, it is not only the air quality in Dhaka that is among the worst, according to the annual global survey of the Economist Intelligence Unit, but Dhaka also ranked as the second least liveable city in the world. Another report published on March 3, 2018 by an online news portal revealed that Dhaka city ranked the second worst in the Traffic Index. Traffic congestion further contributes to declining air quality in the city. The Asian Development Bank reported that the quality of rivers in Bangladesh is the worst among 48 Pan-Pacific countries. Dhaka is surrounded by four rivers, which could be a source of drinking water as well as a source for recreation and trade. However, because of the poor water quality, the water is unsafe even for physical contact. To make things worse, Bangladesh ranked 179 out of 180 countries in the Environmental Performance Index in 2018. The annual EPI ranking is carried out by Yale University and Columbia University in the US. The EPI index is based on nine categories, including air quality, air pollution, heavy metals, water and sanitation. Bangladesh received a score of four out of 100 in air quality in the EPI.

The government of Bangladesh has set the goal to become a middle-income economy by 2021, and to achieve the SDGs by 2030. The concept of sustainable development is based on three equally important pillars: economic growth, social inclusion, and environmental vitality. If Bangladesh wants to be a sustainable society then it is imperative for the government to take the issues of human health, social inclusion, and environmental quality seriously.

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At a country level, weighted by population, Bangladesh emerged as the most polluted country, and Dhaka as the second most polluted capital city in the world, according to the 2018 World Air Quality Report.

PHOTO: RASHED SHUMON

attention span, hyperactivity, and mental deterioration. Chromium can cause allergic dermatitis and cancer. Arsenic is associated with skin damage and increased risk of cancer. Mercury is associated with kidney damage. Nickel is a necessary element in small doses, but it can be dangerous when the maximum tolerable amounts are exceeded.

The sources of these metals can be both natural and anthropogenic. The common anthropogenic sources of these elements

substantial damage to plants and animals, the United States Geological Survey (USGS) and the US Environmental Protection Agency (EPA) have developed guidelines for freshwater sediment screening benchmarks. As per the guidelines, the maximum allowed concentrations (MAC) of certain toxic metals in freshwater sediment measured in mg/kg are set as follows: chromium (43), mercury (0.18), lead (35.8), silver (1), manganese (460), nickel (22.7), copper (31.6), zinc

exceeded the MAC for nickel and manganese, which were found at highest concentrations in dust collected from tree leaves at Dhanmondi Road 15. The dust collected from indoors at Rayerbagh and Banglabazar also showed relatively higher concentration of copper at 199 and 44 mg/kg, respectively. The sample collected from Shahidullah Hall recorded the highest concentration of sulphur at 537 mg/kg compared to the MAC of 130 mg/kg set by the USGS-EPA. Seven out of 9 samples

# Financial independence: Luck or habit?



HABIBULLAH N KARIM

WITH 12.9 percent of our population still living in extreme poverty and nearly 10 percent of the global population living below the lower poverty line, financial independence is a distant dream for hundreds of millions of people around the world. For the poor, financial struggle in everything they do is a given. But even for middle-class families, pecuniary hardship is a constant companion.

In such a situation, financial independence is seen as a mythical goldmine that is never attainable unless you win a lottery, marry into wealth or get adopted by rich parents. Of course, these options rely much more on luck than targeted planning. Therefore, most people tend to be fatalistic when it comes to attempting financial independence on their own—that is, they believe it is beyond their physical ability to get out of hand-to-mouth living and, as such, they accept the continuing vicious cycle of poverty and hardship from generation to generation.

However, extreme poverty has been on the decline globally over the last three decades according to the World Bank and many countries, including Bangladesh, are well on their way to eradicate extreme poverty by 2025. That is a welcome relief, but that still

does not say anything about the financial independence of anyone with a modest income (those who are not in extreme poverty and have the capacity to save) because such independence does not come from monetary compensation earned through physical and intellectual labour but from passive incomes from one's savings and assets. This is where luck gives way to habits.

Every once in a while, we come across

news about celebrities who die a pauper even though they earned millions during their lifetimes. Certainly, luck was on their side when it came to making a great living but their profligate lifestyle drove them into bankruptcy within their lifetimes. Here, habit—or rather bad habits—had more to do with their misfortune than luck.

On the other hand, there are plenty of examples where we see people of modest means

end up reasonably well-off only through strict financial discipline—living below their means and always saving a part of their income in all situations. These people then invest such savings in high-interest bearing deposits, dividend-paying stocks or real-estate properties earning rent. Once you do that, you have passive income to supplement your active income and sooner or later you reach a point where your passive income is more than your disposable needs or living expenses. That is when you reach financial independence which is more a function of expenditure habits than luck. But as with any preaching, it is easier said than done—mostly because we are usually bad at saving as we keep spending more and more in pace, or sometimes even outpacing our active incomes, that is, earnings from our own labour.

Most people believe in instant gratification and if our active incomes allow it then we raise our standard of living to satisfy our comforts and pleasures. However, the habit that has served many successful and financially independent people well is forcing oneself to discipline one's needs to the essentials and opting for delayed gratification when it comes to non-essential comforts and pleasures of life. Financial coaches say that one should always plan to live on at most half their active income, save at least a quarter, and keep the rest for meeting periodic expenses such as clothes and household items, income-tax obligations, medical expenses or other unforeseen expenses. In other words, forming a habit of

seeing only half or less of your active income as disposable income is the proven key to financial independence. This is not easy to do when we have so much temptation before our eyes every time we turn on the TV or our phones and get hit by alluring advertisements or walk by a store displaying their glittery wares every day. Then there is the peer pressure of colleagues, neighbours, friends and children's friends that we often succumb to taking the vacation that everyone else is taking, or buying an extra fridge or TV because every other family is doing the same.

Standing up to peer pressure can be especially difficult when your children beg for the next Game Boy because all the other kids have it. Making a habit not to succumb to constant pressures on such unplanned expenses and sticking to essentials and choosing to opt for delayed gratification—and that too only when passive incomes allow such pleasures—are the ways to incremental financial independence. Once these simple rules are made second nature through practice, the seemingly impossible dream of financial independence can be gradually achieved by anyone. On the other hand, spending on lottery tickets and dating rich consorts may seem like a sure-shot means of coming into wealth quickly but the odds of that are worse than the odds of getting hit by a bus as you cross the street next time.

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ON THIS DAY  
IN HISTORY

March 11, 2011  
THE FUKUSHIMA DAIICHI NUCLEAR DISASTER STRIKES JAPAN

An earthquake and tsunami knocked out the Fukushima nuclear power plant cooling systems causing meltdowns in three reactors. The accompanying radiological release was rated at Level 7, the highest on the scale and on par with Chernobyl.

CROSSWORD BY THOMAS JOSEPH

ACROSS

1 Destiny

5 Used another's words

11 Arkin of "Argo"

12 Foolish

13 Blue cheese

feature

14 Never before seen

15 Long swimmer

16 Warring god

17 Istanbul natives

19 Cry loudly

22 Bee group

24 Chump

26 Suffers

27 Map line

28 Flash of light

30 Contribute

31 Spots on TV

32 Make fitting

34 Trojan War hero

35 Hold up

38 Fairy king

41 Fan publication

42 Change back

43 Cain's brother

44 Comfortable

45 "Hey, you!"

DOWN

1 Renown

2 Lotion additive

3 Yarns

4 Terminate

5 Subatomic particle

6 Except it

7 Hogwarts messengers

8 Mint container

9 Jargon suffix

10 Grass coating

16 Sleeve filler

18 Bear in the air

19 Beef cut

20 Poet Khayyam

21 Physique

22 Heroic tale

23 Feral

25 Field yield

29 Officers above captains

30 Jazz horn

33 "Divine Comedy" writer

34 Open space

36 Bills in tills

37 Wallop

38 -- pro nobis

39 Track action

40 Mother of 43-

Across

41 Use a ray-gun on

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1 2 3 4 5 6 7 8 9 10

11 12 13 14 15 16 17 18 19 20 21

22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

38 39 40 41 42 43 44 45

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YESTERDAY'S ANSWER

ALAS SHINE  
SOBIG LINER  
HOUSEMASTER  
EMSTAP USA  
SUEFOR INON  
PROUD SENT  
UTICA  
TOLL GRAMS  
ORES RECAPS  
PIG HAD NEO  
HOUSE SITTER  
ELMER TILDE  
REELS MESS

BEETLE BAILEY by Mort Walker

THEY SAY ALL THE ANTS IN THE WORLD WEIGH MORE THAN THE PEOPLE

WELL, I'M DOING MY PART!

GREG + MORT WALKER

BABY BLUES by Kirkman & Scott

OKAY, NOW IT SAYS TO READ THIS PARAGRAPH ALOUD.

THE IGUANA IS AMONG THE MOST COMMON LIZARDS IN...

ALOUD... NOT LOUD?

THERE'S A DIFFERENCE?