Launch of CPD-Green Cities Initiative

Greening Cities Through Reducing Air and Plastic Pollution

Presented by

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Acknowledgement

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Outline

1. Introduction
2. Air pollution in Bangladesh
3. Plastic pollution in Bangladesh
4. A vision for green cities in Bangladesh
5. Planned research outputs

1. Introduction

1. Introduction

- With this launch event, CDP is introducing a major new strand of work titled “CPD-Green Cities Initiative”.
- Through this initiative, CPD will be able to identify issues that impedes green growth in the cities of Bangladesh.
- This will maximise the possibility for policy influence by focusing on concrete problems that have a direct impact on people's daily lives.
- Further study will concentrate on research and development of policy solutions on "clean air" and "plastic pollution" in the upcoming year.

1. Introduction

- This launch presentation presents evidence on the relationship between air and plastic pollution, and public health in the economy of Bangladesh.
- Our key interest is to look at the drivers, impacts, and solutions to air and plastic pollution in major cities of Bangladesh.
- With higher industrialisation, urbanisation, and energy consumption in major cities, air and plastic pollution **are posing serious health, environmental, and economic concerns in Bangladesh, while hampering the growth of the economy.**
- Without policy action this problem will get worse with major health and economic costs.
- Addressing air and plastic pollution will require policy and regulatory reforms; fiscal and economic instruments; technological innovation; and the engagement of all stakeholders, including the government, the private sector, and citizens.

2. Air pollution in Bangladesh

2.1 Overview of air pollution in Bangladesh

Bangladesh was

No. 1

for having the most polluted air in the world in 2020 and 2021, according to IQAir.

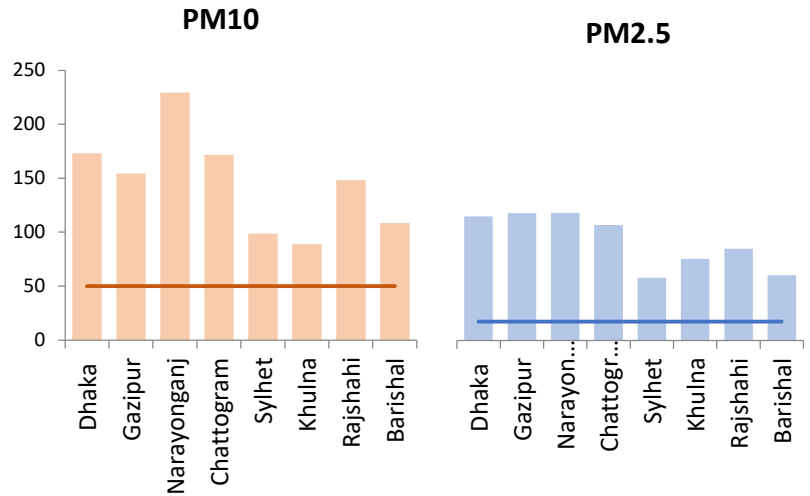
- According to IQAir, **Dhaka was ranked 2nd** for having worst air quality after New Delhi in the Regional Capital City Ranking in 2021.
- According to Bangladesh Bureau of Statistics (BBS), in Dhaka, more than **10 million** people are exposed to poor air quality.
- Air pollution levels in Bangladeshi cities is 15 times higher than WHO guidelines, and 5 times higher than the annual Bangladesh National Ambient Air Quality Standards (BNAAQS).
- The annual pollution level increased by **13% from 2019 to 2020**, despite the lockdowns during the COVID-19 pandemic.

2.2 Trend of air pollution in Bangladesh

- PM pollution rose from 51.6 µg/m3 in 1995 to 63.4 µg/m3 in 2019 – **a 23% increase**.
- This has serious short and long-term health implications, which affects the economy by lowering workforce productivity and causing environmental damage.
- Air pollution is likely to increase in the coming years if strong political intervention and effective policies are not taken immediately.

Particulate matter exceeds standards in major cities of Bangladesh

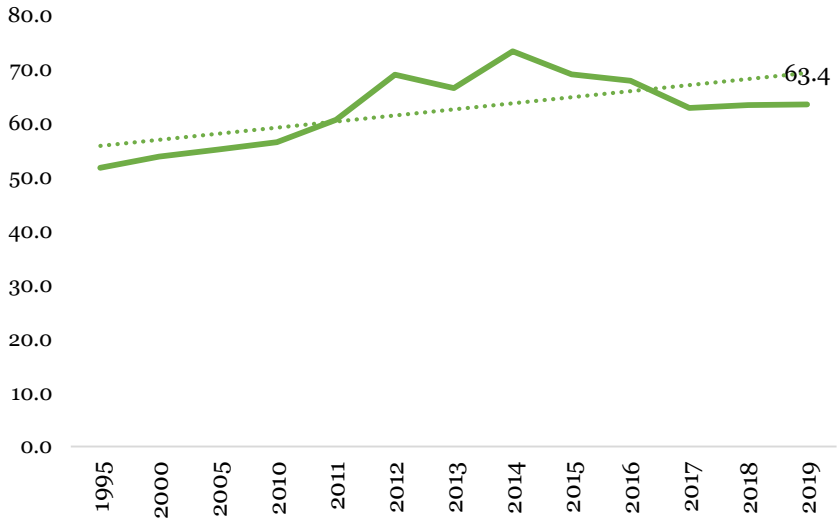
Concentration Level (µg/m³)



Source: Authors' illustration based on data from the Department of Environment (DoE).

Average Ambient particulate matter pollution of Bangladesh

Concentration Level (µg/m³)



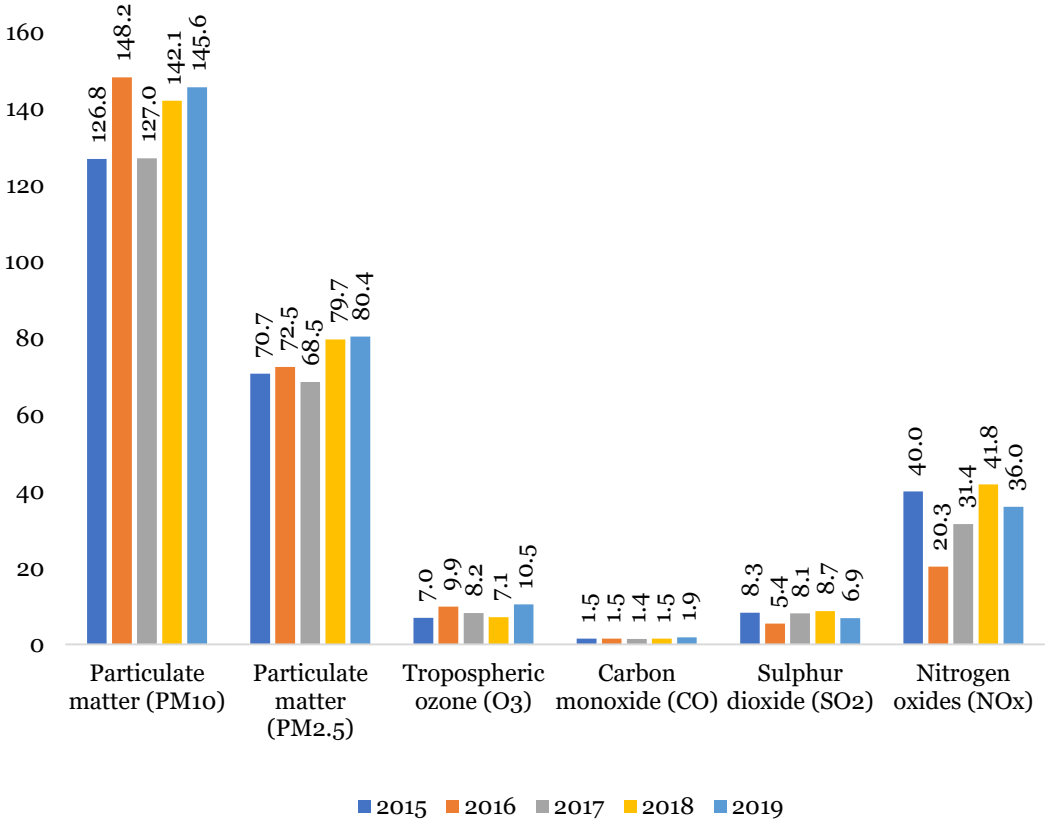
Source: Authors' illustration based on data from Global Burden of Disease.

2.2 Trend of air pollution in Bangladesh

- The concentration level of PM_{10} and $PM_{2.5}$ are the highest, far exceeding the BNAAQS which is set for PM_{10} at 50 µg/m3 and $PM_{2.5}$ at 15 µg/m3
- PM10 level was **126.5 µg/m3** in 2015 which rose to **145.6 µg/m3** in 2019.
- PM2.5 level was **70.7 µg/m3 in 2015** which increased to **80.4 µg/m3 in 2019.**
- Concentration of other pollutants like O3, NOx, CO, and SO2 had been lower than their respective BNAAQS set by the government of Bangladesh.

Particulate Matter (PM2.5 and PM10) has been rising over the years

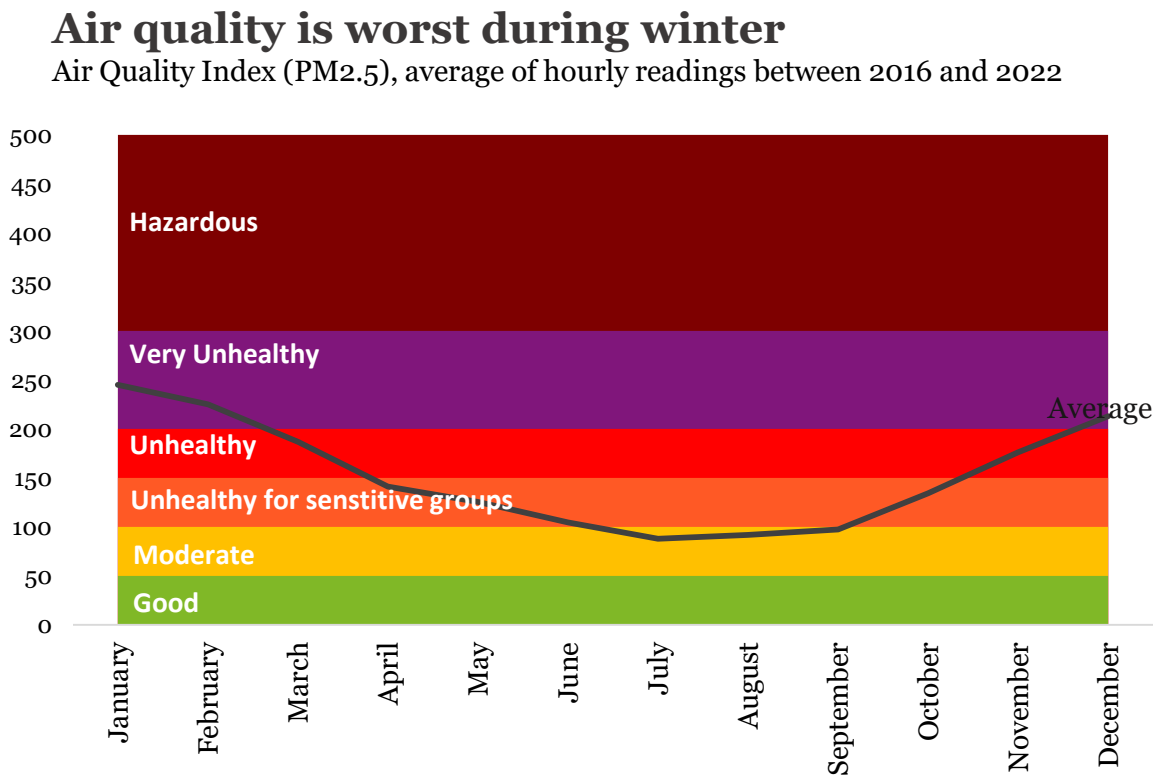
Trend of air pollutants over the last 5 years (concentration in µg/m3)



Source: Authors' illustration based on data from the Department of Environment (DoE).

2.2 Trend of air pollution in Bangladesh

- During drier winter seasons, the air quality of Bangladesh is worse than other seasons.
- On the other hand, during monsoon season, the average concentration of pollutants in the air was comparatively lower.



Source: Authors' illustration based on data US Embassy.

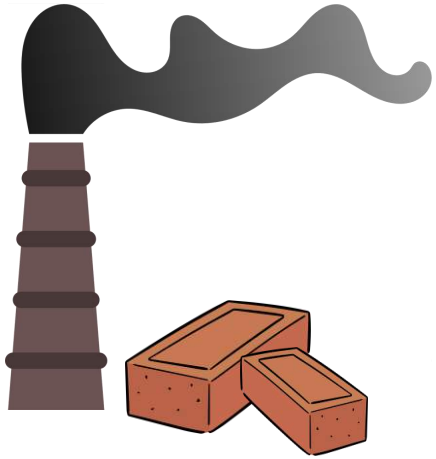
2.3 Drivers of air pollution in Bangladesh

Vehicular emission

- Motor vehicles registered in Dhaka **increased by 283%,** from 1.30million in 2009 to 5.01million in 2021.
- Emission from vehicles has been disproportionately high in recent years.
- This is mostly due to the use of poorly maintained vehicles, adulterated fuels, improper traffic and road management and inadequate parking space.

Brick kilns

- In Bangladesh, bricks are manufactured in a primitive system using traditional methods, imposing serious environmental damage.
- It is estimated that at least 15 billion brick kilns are produced annually in Bangladesh.[1]



1 https://esdo.org/wp-content/uploads/Air-Pollution-in-Bangladesh_ESDO_2020.pdf

2.3 Drivers of air pollution in Bangladesh

Construction activities

- The construction of these projects contributes heavily to air pollution by emitting high levels of PM2.5 and PM10.
- SO2, NO2, CO, O3, methane and other pollutants are highly prevalent close to construction sites.
- Construction sites do not follow rules like covering materials while transporting, storing or discarding. This creates dust pollution.

Other key sources

- Other sources include coal-fired power plants, biomass burning, and waste burning.
- Biomass burning in the agricultural sector emits large volumes of CO2 and other harmful gases.
- The burning of municipal solid waste contains about 12% plastic, which releases toxic gases into the atmosphere.

2.4 Impacts of air pollution on health

- Poor air quality has significant health impacts including leading to:
  - type-2 diabetes,
  - lower respiratory infection,
  - pulmonary diseases,
  - ischemic and cardiovascular diseases,
  - lung cancer, and
  - chronic heart diseases.

- Particulate matter pollution may even affect the neurological condition of new-borns.

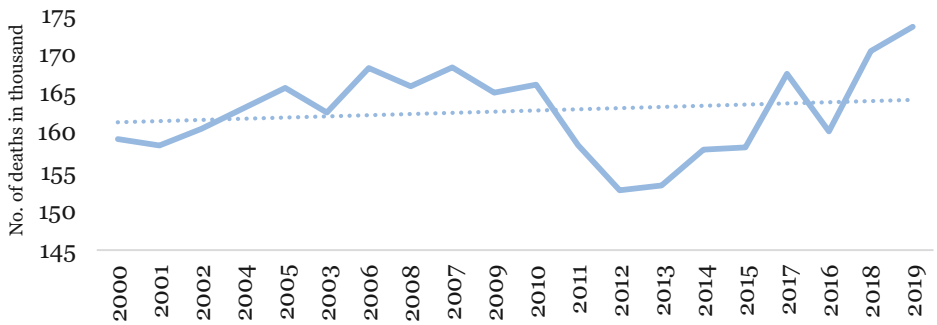
- Children between the ages 1 year to 4 years, and the elderly between 60-95, are the most vulnerable groups.

Exposure to contaminated air causes detrimental health risks and deaths.

2.4 Impacts of air pollution on health

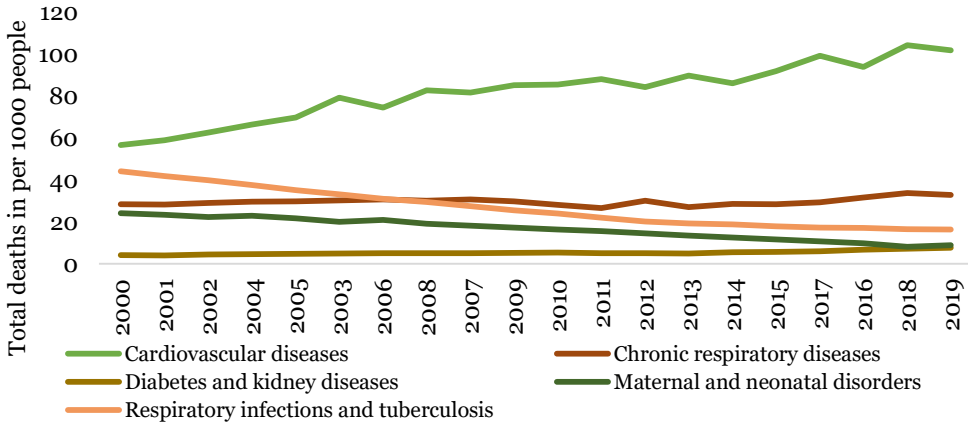
- The number of deaths associated with air pollution were estimated to be 173,515 in 2019. That is about 20.4% of all deaths occurred in 2019.
- Deaths from diseases associated with air pollution have risen by 9% over the last 20 years.
- According to the Air Quality Life Index (AQLI) study, it is estimated that the citizens of Dhaka city are losing more than 8 years of life expectancy on average.
- Deaths caused by cardiovascular diseases are highest, followed by chronic respiratory diseases.

Estimated number of deaths due to causes associated with air pollution in Bangladesh



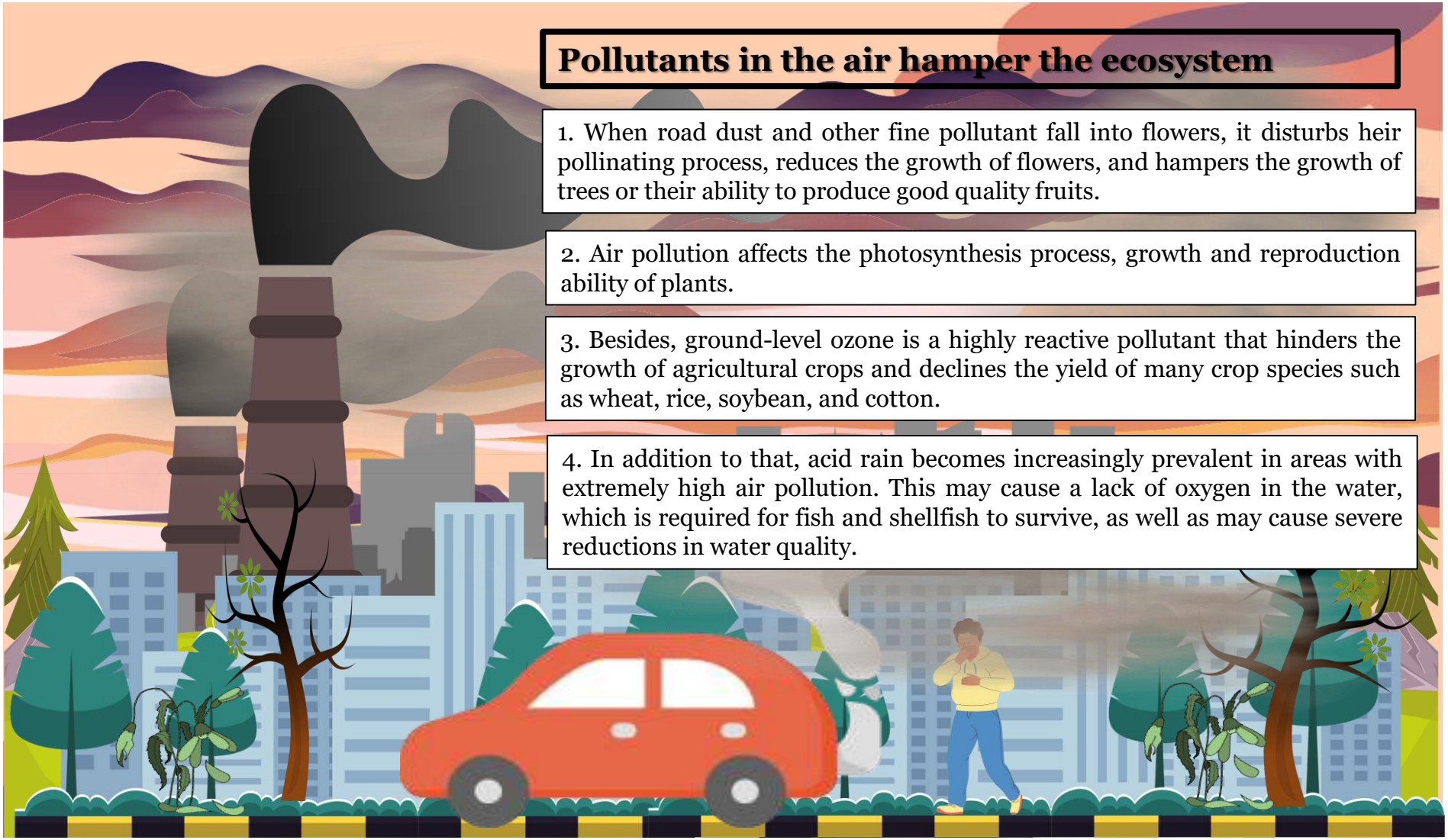
Source: Authors' illustration based on data from the Institute of Health Metrics and Evaluation (IHME) and Global Burden of Diseases (GBD).

Number of deaths from diseases associated with air pollution in Bangladesh (for all sexes and ages)



Source: Authors' illustration based on data from the Institute of Health Metrics and Evaluation (IHME) and Global Burden of Diseases (GBD).

2.5 Impacts of air pollution on the environment



Pollutants in the air hamper the ecosystem

1. When road dust and other fine pollutant fall into flowers, it disturbs heir pollinating process, reduces the growth of flowers, and hampers the growth of trees or their ability to produce good quality fruits.

2. Air pollution affects the photosynthesis process, growth and reproduction ability of plants.

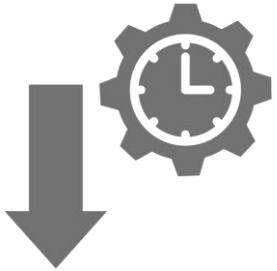
3. Besides, ground-level ozone is a highly reactive pollutant that hinders the growth of agricultural crops and declines the yield of many crop species such as wheat, rice, soybean, and cotton.

4. In addition to that, acid rain becomes increasingly prevalent in areas with extremely high air pollution. This may cause a lack of oxygen in the water, which is required for fish and shellfish to survive, as well as may cause severe reductions in water quality.

2.6 Impacts of air pollution on the economy

- Exposure to unclean air triggers diseases which increase the healthcare cost for individuals.
- Each person had to spend **BDT 8,334** per year on healthcare from their own pocket in 2019.

- Healthcare expenses are a huge burden on the poor and marginalised.
- As an LDC, a low health-GDP ratio means that there is low public spending on healthcare, eventually putting an increased burden on private healthcare expenditure.



- Diseases and high healthcare cost puts a strain on people's work productivity.
- The World Bank estimates the **annual loss of productivity as a result of poor air quality, to be USD 1.44 billion for Dhaka city, and approximately USD 6.52 billion, or 3.4% of its GDP for Bangladesh in 2015.**

2.7 Existing policies in Bangladesh for clean air

In July 1999, the GoB removed lead from gasoline to reduce the harmful emission of the pollutants into the air.

In 2003, the GoB banned and phased out 2-stroke baby taxis from Dhaka city. This helped improve the air quality by eliminating 41% of $PM_{2.5}$ concentration in 2014.

The GoB banned the use of buses and trucks older than 20 years and 25 years respectively.

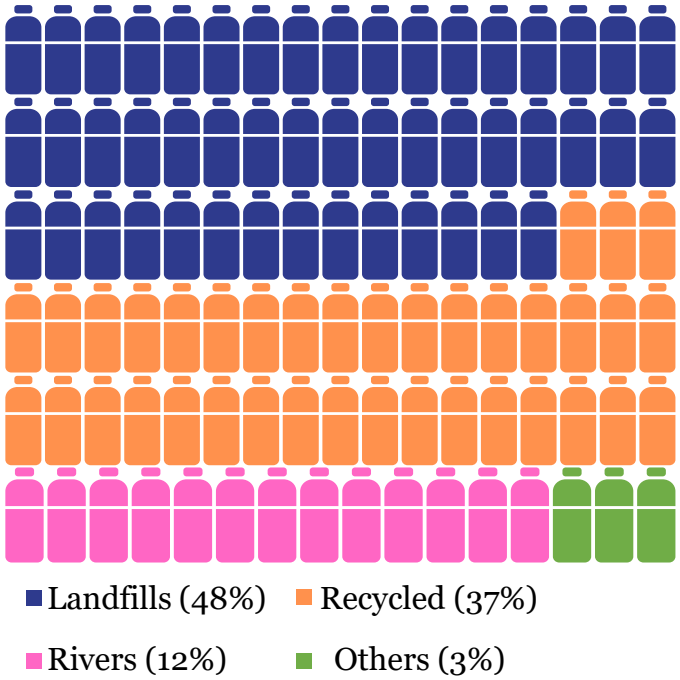
In 2019 the GoB issued a High Court order to close illegal brick kilns and establishment of brick kilns in commercial, residential, and environmentally sensitive areas.

In 2005, the vehicle emission standard was revised and new standards were implemented.

3. Plastic pollution in Bangladesh

3.1 Overview of plastic pollution in Bangladesh

646 tons of plastic waste is generated in Dhaka every year



- Plastic pollution in Bangladesh has received very little attention.
- In urban cities of Bangladesh, high-income households generate more plastic refuse while lower-income households generate mostly organic waste.
- According to a research study titled "Plastic waste inputs from land into the ocean", Bangladesh was **10th** among the top 20 mismanaged plastic generating nations in 2010.
- Plastic pollution is on the rise as urbanisation escalates, with Dhaka generating most of the waste.
- COVID-19 has exacerbated the state of plastic pollution as there was a massive surge in the use of polythene bags and other single-use plastic items.

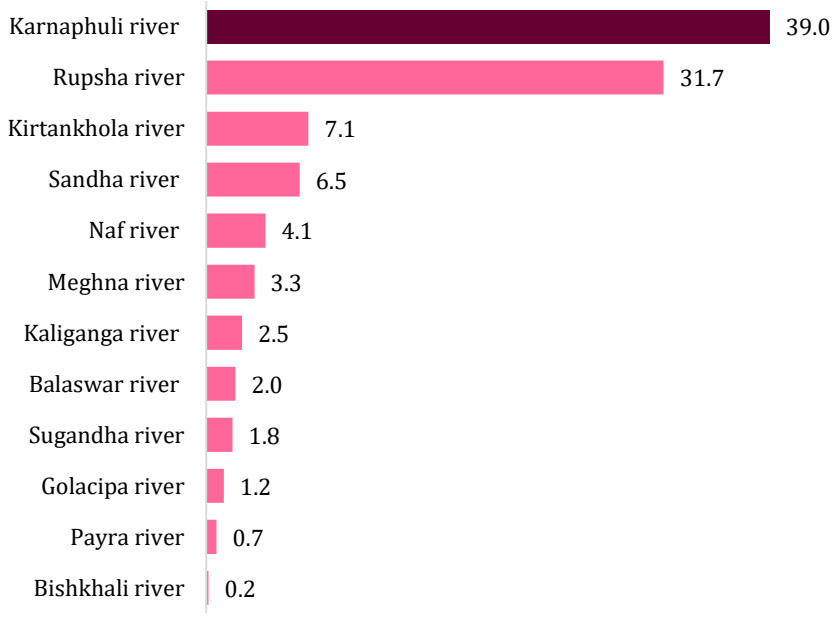
3.2 Drivers of plastic pollution in Bangladesh

Water systems act as a medium for plastic pollution

- Mismanaged plastic waste is a significant source of contamination in water systems.
- In Bangladesh, about 1 million metric tons of mismanaged plastics are generated every year around the coastal areas.
- Among major riverine sources, the Karnaphuli River contributes **39%** of mismanaged plastic, followed by the Rupsha River, which accounts for **31.75%**.
- Most Bangladeshi rivers are transboundary rivers. Therefore, a significant amount of plastic waste near coastal areas comes from neighbouring countries.

The Karnaphuli River has the highest share of mismanaged plastic among major riverine sources

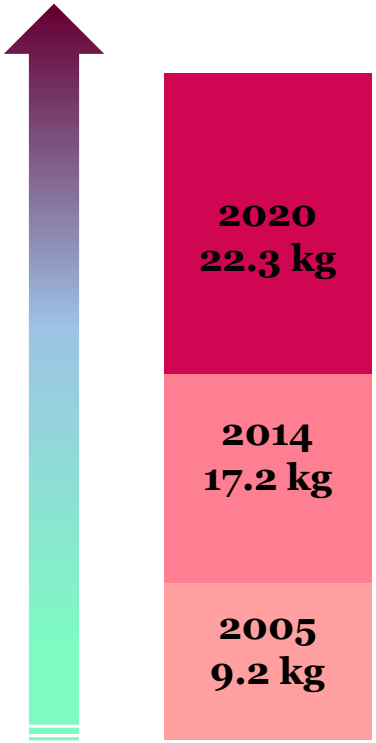
Percentage of total mismanaged plastic from different rivers in Bangladesh



Source: Author's illustration based on data from The Ocean Clean Up.

3.2 Drivers of plastic pollution in Bangladesh

Per capita plastic consumption has more than doubled in Dhaka in the last 15 years



Unregulated production of plastic products

- The plastic industry in Bangladesh is producing a great volume of plastic products to meet the domestic and international demand.
- In Dhaka alone, the average consumption of plastic has increased from **9.2 kg** annually in 2005 to **22.25 kg** per year in 2020.
- In Bangladesh, with the easing of lockdown restrictions, the production of plastic which is being exported has begun to rise dramatically once more.
- The growth in plastic output that is being exported indicates that pre-COVID levels of plastic production may soon be surpassed.

3.2 Drivers of plastic pollution in Bangladesh

Excessive consumption and indiscriminate disposal of single-use plastics (SUP)

- SUPs, such as plastic bags, clear plastic thin wraps, coffee cups and lids etc. are generally used once and then thrown away.
- These SUPs are disposed of indiscriminately, contributing to plastic pollution.

The surge in the use of SUP driven by COVID-19

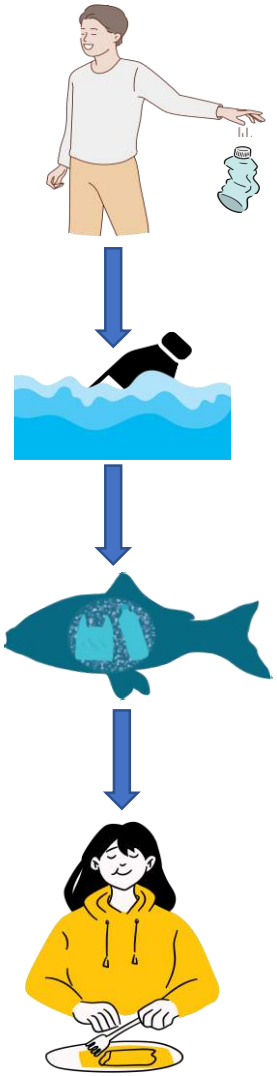
- During the pandemic, majority of the waste collectors were unable to work owing to the infection and subsequent lockdown.
- Due to the fear of infection, individuals changed their lifestyles and began to be more reliant on SUPs.
- With the advent of COVID-19, medical masks, PPE, plastic gloves, and polythene bags have all become increasingly popular which increased the volume of plastic waste.

3.2 Drivers of plastic pollution in Bangladesh

Inadequate waste management

- In Bangladesh, households do not segregate their wastes further contributing to plastic pollution.
- The informal sector mostly collects PET bottles as they have a high market value.
- Materials such as polythene packaging, low-density polyethene (LDPE), and multilayer plastic (MLP) products are often not collected by waste collectors either because they have a lower market value, are difficult to melt, time-consuming to separate and collect, or there is no technology to recycle such materials.
- There is also a lack of secondary collection stations which further increases plastic pollution.

3.3 Impacts of plastic pollution on health

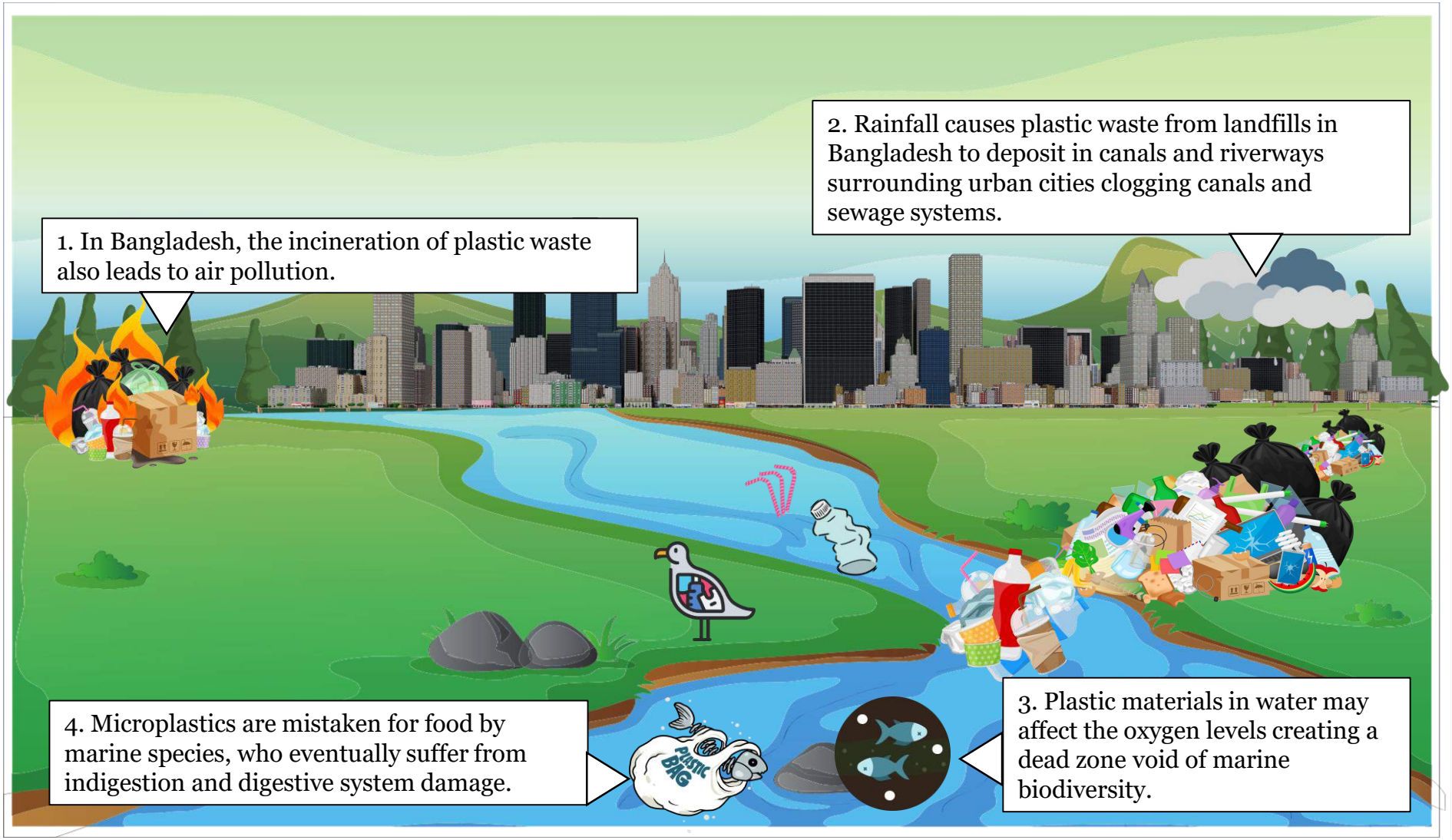


- Plastic products contain various additives such as Bisphenol A (BPA), which can leak out of the plastic under heat and pressure and may cause eye irritation, blindness, and respiratory problems, liver damage, and other ailments.
- More so, toxic plastics may also lead to cardiovascular issues and genotoxic and gastrointestinal causes.
- Plastic pollutants can also enter the human body through the food chain as individuals may consume fish contaminated with plastic particles.
- Microplastics may also be carcinogenic, cause neurotoxicity, and low birth weight.
- Burning plastic wastes releases toxins that worsen respiratory diseases, and heart ailments, and can damage the nervous system.

3.3 Impacts of plastic pollution on health

- Plastic wastes have collapsed sewage systems by disrupting natural channels which cause the streets of urban areas to flood leading to mosquito-borne diseases such as dengue and malaria.
- In Dhaka city there were 65 canals which carried rainwater to the rivers. However, due to plastic pollution 22 canals have mostly been turned into dumping zones.
- SUPs may contribute to the spread of the SARS-CoV-2 virus. The virus can survive up to **3 days or 72 hours** on plastic wastes which can be hazardous to human health considering how SUPs are disposed of indiscriminately.

3.4 Impacts of plastic pollution on the environment



3.5 Impacts of plastic pollution on the economy

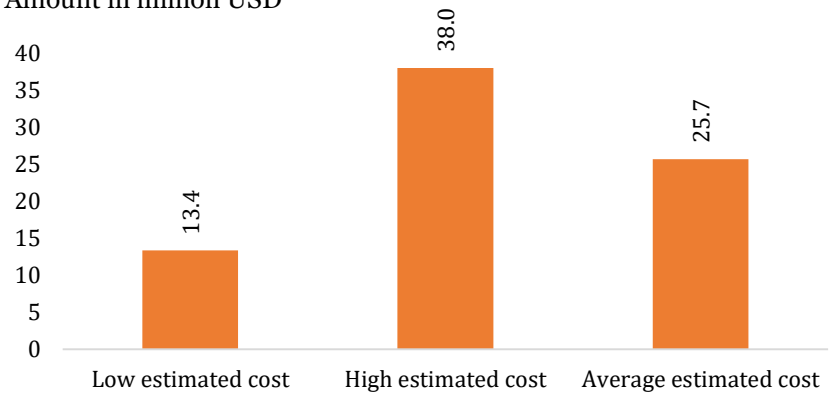
Plastic pollution has significant economic costs.

- Apart from environmental and health impacts, the economic effects of plastics are equally significant.
- Globally it is estimated that plastic pollution accounts for **USD 2.2 trillion** annually in terms of environmental and social impairment.
- Each year nearly **USD 1.5 trillion** is lost owing to changes in the marine resources, oxygen, clean water, cultural and recreational significance, and significant climate control.
- Furthermore, additional costs occur due to the production and afterwards the incineration of plastic wastes at the disposal stage.

3.5 Impacts of plastic pollution on the economy

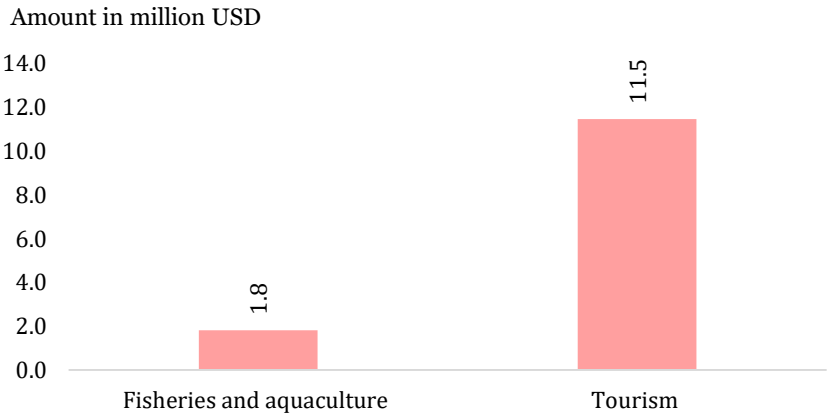
- In Bangladesh, plastic pollution may have substantial economic costs for the tourism and aquaculture and fisheries industries and may contribute to a large magnitude of the clean-up cost for the government of Bangladesh.
- The estimated average annual income loss from tourism, and aquaculture and fisheries in 2020 were **USD 11.5 million** and roughly **USD 2 million**, respectively.
- The highest estimated annual clean-up cost of plastic waste for the government in 2020 **was USD 38 million.**
- This amount was as high as **30%** of the total revised budget for the Ministry of Environment, Forest, and Climate Change (MoEFCC) in 2020.

Estimated clean-up cost for the Government of Bangladesh as per 2020



Source: Author's illustration based on data from The Ocean Clean Up.

Average estimated annual loss in revenue as per 2020



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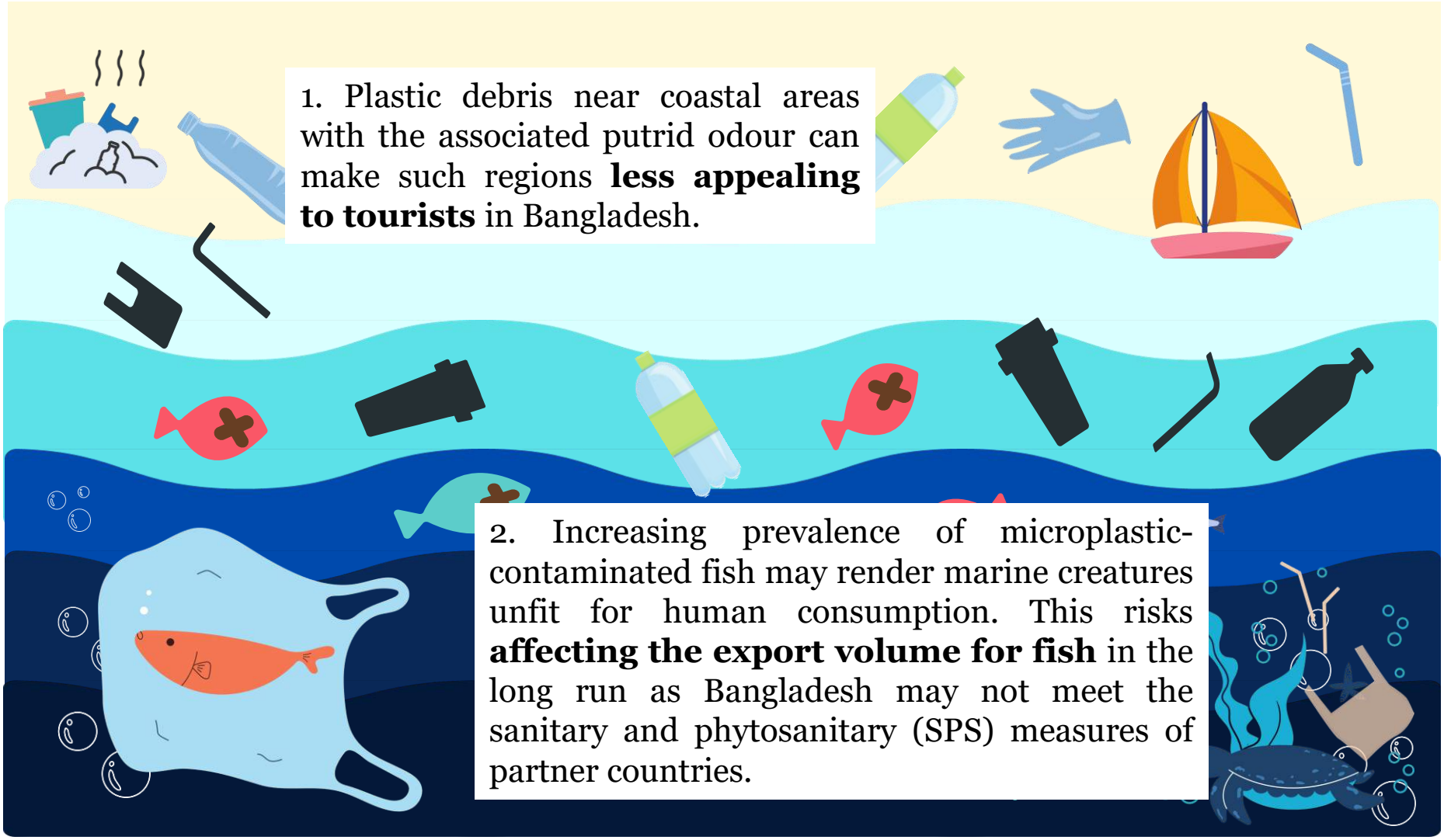
3.5 Impacts of plastic pollution on the economy



1. Plastic debris near coastal areas with the associated putrid odour can make such regions **less appealing to tourists** in Bangladesh.

2. Increasing prevalence of microplastic-contaminated fish may render marine creatures unfit for human consumption. This risks **affecting the export volume for fish** in the long run as Bangladesh may not meet the sanitary and phytosanitary (SPS) measures of partner countries.

3.5 Impacts of plastic pollution on the economy

3. Most of the municipality's stipulated budget is used up to cover the expenses of clean-up costs as waste collectors transport wastes from the streets and secondary dumping stations to landfills.

4. **Cost of treatments for health impairments**, especially for the waste collectors from the informal sector.

5. This will **increase out-of-pocket expenditure** towards medical bills which can reduce their savings further pushing them into poverty.

3.6 Existing policies in Bangladesh for plastic pollution

2002

Bangladesh imposed a ban on plastic shopping bags under the Environment Act 1995.

2010

National 3R Strategy for Waste Management was adopted.

2013

The Mandatory Jute Packaging Act for agricultural products came into force to promote the Jute industry and reduce dependence on plastic packaging.

2015

The Plastic Park Project was introduced which relocated old plastic factories from old Dhaka to a new location.

2020

The High Court issued an order to rigorously enforce the prohibition on plastic bags across the nation. The High Court also issued a ban on carrying, selling and advertising plastic carrier bags and other single-use plastics in coastal areas.

2021

The government published the Solid Waste Management Regulations under the Environment Act 1995.

4. A Vision for Green Cities in Bangladesh

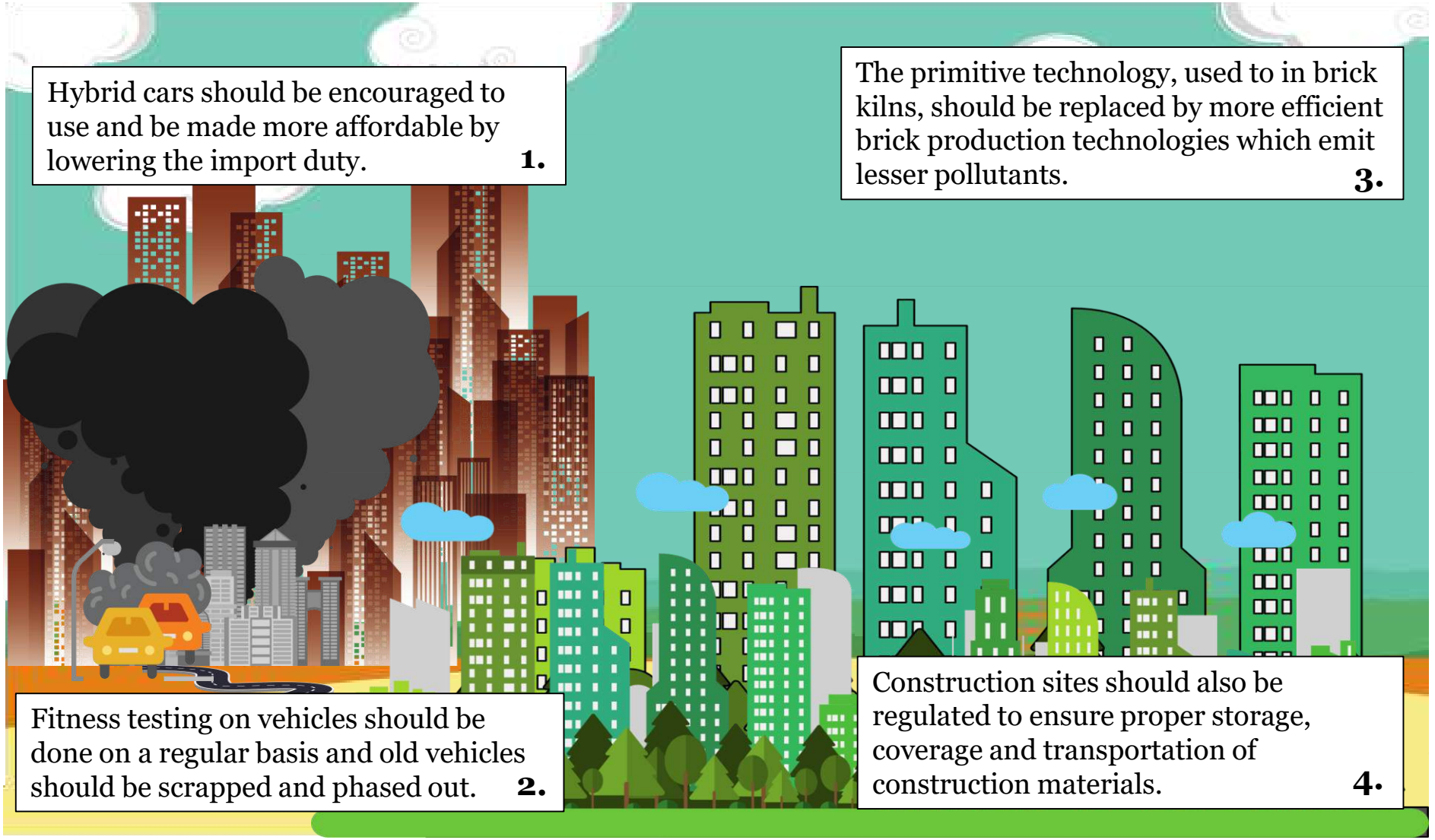
4. A vision for green cities in Bangladesh

- In 2009, the Department of Environment (DoE) undertook an extensive project titled “Clean Air and Sustainable Environment” to address the problems of air pollution. Under this program, the air quality index (AQI) was established for different cities in Bangladesh to get a clear idea about the daily air quality.
- However, the rising health, economic and environmental concern of air pollution has made it necessary to take more discrete actions to improve air quality in Bangladesh.
- The government released a draft of the Clean Air Act in 2019 to manage the national ambient air quality of Bangladesh, but the act has not yet been implemented.
- Strong enforcement by the DoE and other public and private stakeholders can help Bangladeshi cities attain cleaner air and a greener environment.
- Environmental experts and policymakers should work closely to merge economic and environmental policy to get health and economic benefits.

4. A vision for green cities in Bangladesh

- In the case of plastic pollution, there is an absence of recycling technology and waste segregation by households in Bangladesh.
- Despite the current restriction on polythene bags, the government lifted the **5%** supplementary duty on all plastic or polythene bags in **FY2022.**
- This undermines the argument for a circular economy and makes it more difficult to limit plastic pollution.
- The practice of recycling plastic needs to be implemented through subsequent policy measures adhering to persuasive and regulatory incentives.
- However, in the long run, the use of plastics entering the value chain must also decrease.
- There has to be a behavioural change among all the stakeholders through mediums of economic incentives, and basic duties suggested by morals and ethics to bring plastic pollution in Bangladesh into the circular economy.

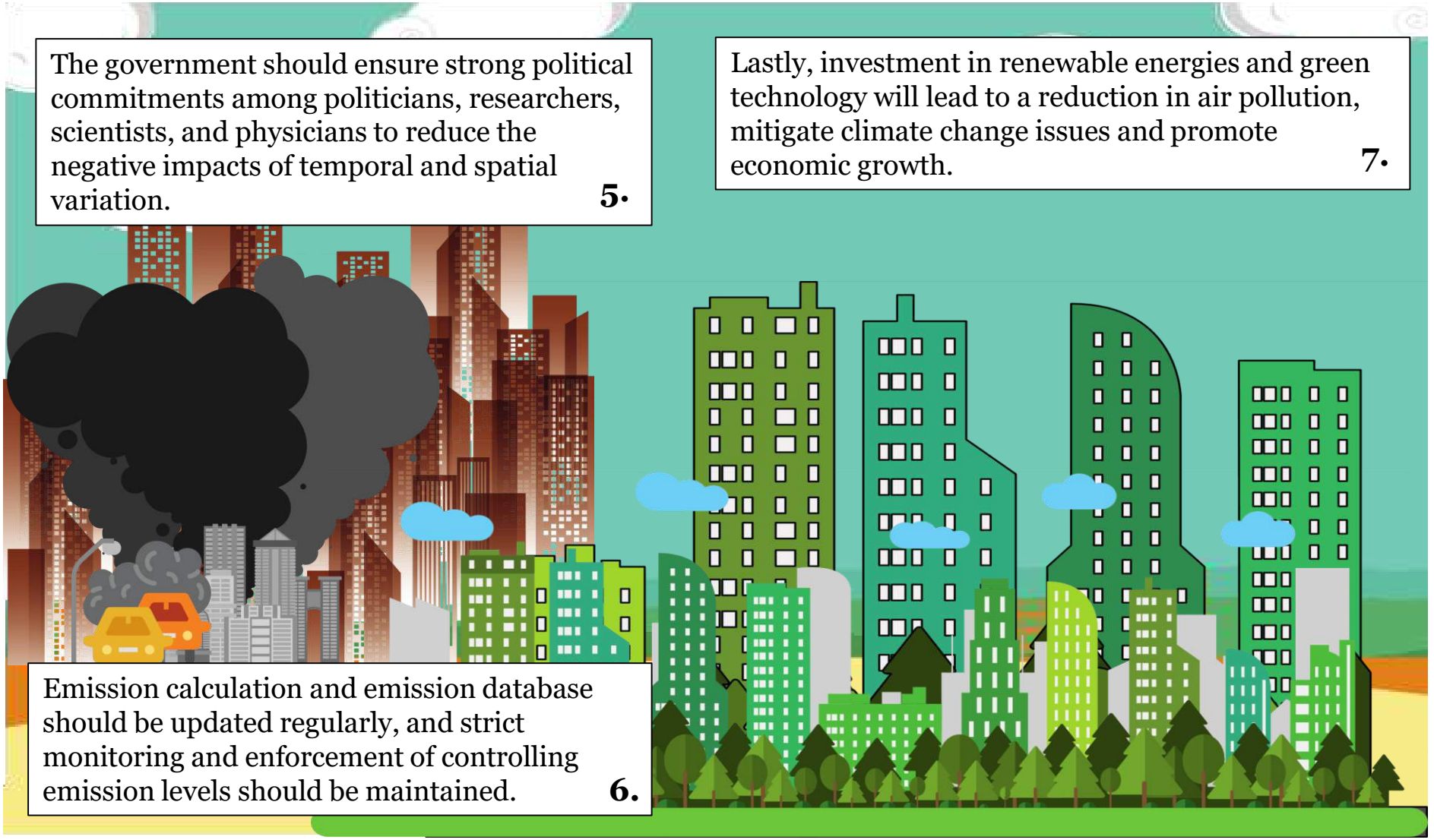
4.1 The way forward for air pollution



4.1 The way forward for air pollution

The government should ensure strong political commitments among politicians, researchers, scientists, and physicians to reduce the negative impacts of temporal and spatial variation. **5.**

Lastly, investment in renewable energies and green technology will lead to a reduction in air pollution, mitigate climate change issues and promote economic growth. **7.**



Emission calculation and emission database should be updated regularly, and strict monitoring and enforcement of controlling emission levels should be maintained. **6.**

4.2 The way forward for plastic pollution

1. Plastic wastes have to be separated at the source which will enable waste collectors to sell all kinds of plastic wastes including SUPs and earn a higher return from it.

2. The city corporations need to facilitate a network between plastic manufacturers and waste collectors to increase the collection of all types of plastic items.

3. The government and the private sector need to collaborate to create a market for SUPs.

4. Producers need to take responsibility and design products that are sustainable and easy to recycle.

5. Research and development and investment are needed to explore the ways in which plastic wastes can be turned back into petroleum through pyrolysis.

6. It is important to reduce the quantity of plastic entering the value chain by promoting the use of sustainable, affordable, and alternative materials to plastic.

5. Planned Research Outputs

6. Planned CPD research outputs

- The study “CPD-Green Cities Initiative” advocates in favour of key aspects of green urbanisation. It will run for at least the next year.

- With this research, CPD will be able to link what can be an abstract idea of green growth to tangible issues which affect the daily lives of Bangladeshis living in the cities.

- The next stages of the work will be carried out concurrently over the course of the ensuing year and will concentrate on "clean air" and "plastic pollution," two of the specific problems mentioned under the "CPD-Green Cities Initiative.“

- Under this context, the next phase of the study will include-

  - One youth/student discussion and competition on green ideas
  - One day-long workshop session for journalists
  - Research reports
  - Briefing notes based on research reports
  - Dialogues with key stakeholders
  - Social media activities (live streaming, short videos etc.)
  - Newspaper opinion pieces
  - Blogs
  - Video documentaries

Thank you

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