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# Climate Change: Causes, Consequences and Mitigation Strategies

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## ABSTRACT

*Climate change is the variation in the earth's global climate or in regional climates over time. Climate change has been recognised as the foremost environmental problems of today's life and has become a subject of considerable debate. It is predicted to lead to adverse. In the period since the industrial revolution, human emissions of greenhouse gases from fossil fuels combustion, deforestation and agricultural practices have led to global warming and climate change. Climate change is a global problem and addressing it involves both reducing carbon emissions and adapting to its impact. Mumbai is one of the most vulnerable port city in the world and one of the most densely populated city in the world. The city is vulnerable to climate change induced hazards, including sea level rise, storm surge, flooding and coastal erosion. Climate change impacts Will lead to economic losses for various sectors. In this paper, the impacts of climate change on the financial capital of India, Mumbai have been described. These include the impact of temperature rise on rains and floods and their consequent effects on health. The government has implemented different laws of climate change for the protection of environment. This study provides vital information about the climate change, laws and the solution for it.*

## KEYWORDS

*Climate change, Causes, Impacts, Solutions, Laws, Health.*

## INTRODUCTION

Climate change is one of the most challenging problems of today's life. As the days are passing the impact of climate change are getting more adverse and is a threat to existence of life. Climate change can cause global as well as local impacts. Climate change refers to long term shifts in temperature and weather patterns. Climate change occurs when the earth's average temperature changes dramatically over time. Climate change affects mostly in coastal region due to the high population. Mumbai city, the financial capital of India is the riskiest city because of its highest population exposed to climate change. Climate related hazards, urban development and changing vulnerability pattern compel cities across the world to deal with new and emerging forms of risk. During the 20<sup>th</sup> century, Mumbai expanded to accommodate it's growing economy and population. More creeks, streams and mangroves began to vanish under roads, buildings and sewage. Extreme weather events have severe consequences for human society. Over the coming decades, the pressures of urbanization may be aggregated by man-made climate change and increase in greenhouse gas. Several studies have investigated the vulnerability of Mumbai in the present and future climate scenarios. The city of Mumbai has experienced uncontrolled economic and demographic growth over time.

## CAUSES OF CLIMATE CHANGE

Fossil fuels – coals, oil and gas – are by far the largest contributor to global climate change. Various reasons for climate change are as follows:

### 1. Transportation

The car, trucks, ships and planes that we use to transport ourselves and our goods are a major source of global greenhouse gas emissions.

#### **Solution:**

We can't totally stop our transportation as it is a part of our life but by using some methods we can reduce it like by using public transports rather than using private vehicles daily for example if 4 different men use 4 different vehicles for traveling it will cause more pollution and also waste of fuel but if they travel by public transports like railways or buses it might reduce. We can also use electric vehicles (EVs).

### 2. Manufacturing Goods

Manufacturing and industry produce emissions, mostly from

burning fossil fuels to produce energy for making things like cement, iron, steel, electronics, plastics, clothes and other goods.

**Solution:**

Factories and industries can change their energy sources to solar, hydropower or also to wind. They can also put up technology which saves energy. Industries and factories should recycle and reuse the things which they need, they should also look that they reduce waste.

**3. Electricity Generation**

Generating electricity and heat by burning fossil fuels causes a large chunk of global emissions. Most electricity is still generated by burning coal, oil or gas which produces carbon dioxide and nitrous oxide.

**Solution:**

Electricity generation should now be changed to renewable energy sources like solar power, wind power, hydropower, geothermal energy. We should also stop wasting electricity. In urban cities like Mumbai there is a lot of waste of electricity. We can use sensor lights or bulb.

**4. Agriculture**

The advent of modern, industrialized agriculture has significantly altered the vital but delicate relationship between soil and the climate. Greenhouse gas emissions also come from packaging and distributing food.

**Solution:**

Traditional agriculture was far better than modern agriculture with time we need to get to modern but it harms our mother nature. There are few people who left doing traditional agriculture, as modern agriculture is easy and fast to do so farmers might choose modern agriculture. I think fertilizer are also a big problem, so it should be reduced or stopped.

**5. Deforestation**

Cutting down forest to create farms or pastures, or for other reasons, causes emissions since trees when they are cut down, release the carbon they have been storing. Though logging and other forms of development, we are cutting down or digging up vegetative biomass and releasing all of its stored carbon into the air.

**Solution:**

Deforestation impacts most on climate change. Deforestation is increasing in India day by day. We should protect our forests and trees, deforestation is not only about cutting down trees but also about distributing the ecosystem. If we are cutting down the trees so double of it should be planted.

**6. Power Buildings**

Globally, residential and commercial buildings consume over half of all electricity. Every day, great strides are been made in energy efficiency. Growing energy demand for health and cooling with rising air conditioner ownership as well as increased electricity consumption for lighting, appliances has contributed to carbon dioxide emissions from buildings.

**Solution:**

Like stated before urban cities waste a lot of electricity, there is only way to stop it that we should stop wasting the electricity, we should also look after it that no one else should waste it.

**7. Our Lifestyle Choices**

The decisions we make everyday as individual, which products we purchase, how much electricity we consume, how we get around, what we eat and what we don't , food waste etc makes up greenhouse gas emissions. Our Lifestyle have a large impact on our planet.

**Solution:**

Our lifestyle choices are in our hands, we should look after that what we purchase is really necessary or not. We should look after our diet, fashion, reduce plastic in our day to day life.

**IMPACTS OF CLIMATE CHANGE**

India, particularly the west coast, is at high risk because we are in the tropical belt where the weather system are relatively short and fast moving, and hence less predictable. The impacts of global warming are hence heightened in the tropics. Sea level rise is one of the most significant consequences of climate change and Mumbai finds itself on the front lines of the battle. Due to the climate change more frequent and intense drought, storms, heat waves, rising sea levels, melting glaciers and warming Ocean can directly harm animals, destroy the places they live, and cause destructions on people's livelihoods. Hotter temperatures, more severe storms, increase in drought, a warming rising ocean, loss

of species, shortage of food, health risk, poverty and displacement are the major impacts of climate change. Climate change impacts will lead to economic losses for various sectors.

### **Estimated economic losses due to the impact of climate change in Mumbai**

<b>Type of impact</b>	<b>Type of costs and period of impact</b>	<b>Costs in rupees (Crores)</b>
<b>Dislocation due to extreme events of flooding of low-lying areas every five years till 2050.</b>	Cumulative costs over the period 2005- 2050	407.6
<b>Material damage to low lying areas due to extreme events every five years till 2050</b>	Cumulative costs over the period of 2005- 2050	6413
<b>Mortality costs due to extreme events of flooding every five years till 2050</b>	Cumulative costs over the period of 2005- 2050	3050
<b>Disability adjusted life years (DALYs) lost due to disease like malaria, diarrhoea and leptospirosis</b>	Cumulative costs over the period of 2005- 2050	3153
<b>Building foundation damages for the period till 2050 due to Sea level rise</b>	Single cost estimate for the year 2050	15 01 725
<b>Tourism loss: less number of tourists visiting Mumbai</b>	Single cost estimate for the year 2050, as compared with the base year 2005	19 63 500

All these issues are likely to worsen under a changing climate when the competition increase for better living conditions.

### **SOLUTIONS FOR CLIMATE CHANGE**

Climate change is happening now, and it's the most serious threat to life on our planet. The few measures for the climate change are as follows – keep fossil fuels in the ground, invest in renewable energy, switch to sustainable transport, help us keep our home cost, improve farming and encouraging vegan diets, restore nature to absorb more carbon, protect forests, protect the oceans, our food, fashion, transport and other lifestyle choices have different impact on the climate change so it's consumption should be

reduced, reduce use of plastic etc. BMC has allocated INR 31,774.59 Cr for capital expenditure in FY 2024-2025 of which an estimate INR 10,224.24 Cr has been allocated for climate related activities. An additional INR 2163.8 Cr has been allocated towards activities that integrate some components of the Mumbai Climate Action Plan (MCAP) such as utilising LED lights, plantations/landscaping, rooftop solar, and sewage treatment plans in new constructions, which makes up 6.81% of the capital expenditure budget. The table below shows how budgetary allocation is split across MCAP's six sectors:

<b>S.No.</b>	<b>Sector</b>	<b>Budgetary allocation B.E. (2024-2025) in thousands</b>	<b>% Splits w.r.t. total capital budget</b>
<b>1</b>	Energy and Buildings	3,24,790	0.10%
<b>2</b>	Integrated Mobility	84,000	0.03%
<b>3</b>	Sustainable Waste Management	26,21,600	0.83%
<b>4</b>	Urban Greening and Biodiversity	17,78,426	0.56%
<b>5</b>	Air Quality Management	3,53,840	0.11%
<b>6</b>	Urban Flooding and Water Resource Management	9,70,79,774	30.55%
	<b>Total</b>	10,22,42,430	32.18%

BMC is supporting implementation of climate activities across the city through other measures, like the Greening Mumbai Manual, Mumbai Air Pollution Mitigation Plan, up to 15% subsidies on property taxes for in- situation waste management and rainwater harvesting, rainwater harvesting manual, standard operating procedure (SOP) for EV charging stations in multi-storey buildings for two/three/four wheelers and so on.

### **LAWS FOR CLIMATE CHANGE**

- **The Air (Prevention and Control of Pollution) Act, 1981**  
**[Act No. 14 of 1981]**  
**[29<sup>th</sup> March, 1981]**  
 An Act to provide for the prevention, control and

abatement of air pollution, for the establishment, with a view to carrying out the aforesaid purposes, of Boards, for conferring on and assigning to such Boards, powers and functions relating thereto and for matters connected therewith.

➤ **The Environment (Protection) Act, 1986**  
**[Act No. 29 of 1986]**  
**[23<sup>rd</sup> May 1986]**

An Act to provide for the protection and improvement of environment and for matters connected therewith.

➤ **The Water (Prevention and Control of Pollution) Act, 1974**  
**[Act No. 6 of 1974]**  
**[23<sup>rd</sup> March, 1974]**

An Act to provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water, for the establishment, with a view to carrying out the purposes of aforesaid, of Boards for the prevention and control of water pollution, for conferring on and assigning to such Boards powers and functions relating thereto and for matters connected therewith.

➤ **Forest Conservation Act, 1980**  
**[Act No. 69 Of 1980]**  
**[27<sup>th</sup> December, 1980]**

An Act to provide for the conservation of forests and for matters connected therewith or ancillary or incidental thereto.

➤ **Energy Conservation Act, 2001**  
**[Act No. 52 Of 2001]**  
**[29<sup>th</sup> September, 2001]**

An Act to provide for efficient use of energy and its conservation and for matters connected therewith or incidental thereto.

➤ **Electricity Act, 2003**  
**[Act No. 36 Of 2003]**  
**[26<sup>th</sup> May, 2003]**

An Act to consolidate the laws relating to Generation,

transmission, distribution, trading and use of electricity and generally for taking measures conducive to development of electricity industry, promoting competition therein, protecting interest of consumers and supply of electricity to all areas, rationalisation of electricity tariff, ensuring transparent policies regarding subsidies, promotion of efficient and environmentally benign policies, constitution of central electricity authority, regulatory commission and establishment of Appellate Tribunal and for matters connected therewith or incidental thereto.

- **National Green Tribunal Act, 2010**  
**[Act No. 19 of 2010]**  
**[2<sup>nd</sup> June, 2010]**  
**As amended by**  
**The Tribunal Reforms Act, 2021**  
**[33 of 2021] [4<sup>th</sup> April 2021]**

An Act to provide for the establishment of a National Green Tribunal for the effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto.

### **WHAT CAN WE DO?**

- ❖ There are many environmental crimes happening everyday in front of us but we don't know what to do for example crimes like illegal logging, pollution, illegal dumping etc. If you face any environmental related crimes you can visit nearby police stations there is not a specific police station for it but there are units.
- ❖ The National green Tribunal is a separate court that only deals with cases related to the environment. State pollution control boards is another thing which every state in India has it owns, pollution control board is one which enforces environmental laws and regulations.

### **CONCLUSION**

Climate change is the problem which is increasing day by day. It is high time to look after climate change, as it is not only the problem of India but whole world. Mumbai is one of the populated

city in India, nowadays air quality index (aqi) is also very poor, not only Mumbai but many cities in India. There are many ways to prevent climate change, everyone should know take climate change seriously its high time. Government is trying their best, but without support of common men climate change can't stop. There should be education given on climate change and how to stop it. We have already destroyed our mother nature by using plastic, doing competition in making buildings, waste of food, People on name of show off are disturbing our mother nature, if this does not stop then nature for sure show reaction which already has started.

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