

EFFECTS OF AUTOMOBILES ON ENVIRONMENT

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Introduction

Human beings need environment. Environment does not need us. They are not dependent on us for their existence. But our existence is totally dependent on our environment. We can only pollute, degrade and damage environment but we can not keep our environment in the same degraded manner in future time because earth has the capacity to regenerate itself. Long centuries back different kinds of animals were living on this planet before that asteroid falling on this earth. We all are aware about this theory that life was completely extinct because of that incident. Later on different kinds of species came into existence through evolution and adaptation. We must learn one lesson from that incident that no matter what happen to this planet it will regenerate itself in few thousands years. But we can not do the same. So when we are polluting, degrading and damaging our environment we are in reality damaging ourselves and creating dangerous situations for our future generations. Human beings can not live without natural environment but not vice versa.

There are two types of activities which affects environment weather, and climate. They are natural activities and man made activities. Man made activities are also known as anthropogenic activities. Transportation or automobile sector comes under the anthropogenic activities which is negatively affecting the climate and results in global warming. We should plan a comprehensive programme for the prevention and control of air pollution through automobiles. We should lay down new standards for emission of air pollutants into the atmosphere from automobiles.

Life forms emerged on this earth so many lakhs of years ago because of atmospheric oxygen O₂ and stratospheric ozone O₃. Oxygen was essential condition for breathing of different beings and ozone was necessary for the protection against solar ultraviolet rays. But now a days we are polluting oxygen which we breath as well as we are also damaging ozone layer which protects us from UV rays by production of carbon dioxide from different anthropogenic activities specially automobile sector and transportation which results in air pollution, ozone depletion, global warming, climate change, green house gas effect, melting of glaciers, rise of sea water level etc. Man made activities like industrialization, transportation, technological

advancement, agriculture, mining etc. have disturbed the natural balance of our environment. Desire to have a better living standards in terms of material comforts leads to various types of problems like rise in temperature, low agricultural productivity, loss of ecosystem & biodiversity, deforestation, rise in sea level uncontrolled exploitation of natural resources and various adverse effects on human health.

Environmental Degradation

Man is surrounded by biotic and abiotic components together known as environment. Environment degradation means damaging, demolition or deterioration of natural environment through depletion of natural resources such as air, water and soil. The term also includes destruction of ecosystem and extinction of animal life. An automobile is a self-propelled motor vehicle intended for passenger transportation on land. It usually has four wheels and an internal combustion engine fueled most often by gasoline, a liquid petroleum product. Economic development is need of the hour because human beings wants better standard of living. Better materialistic life style resulted in multiplication of needs and wants and these have accelerated the pace of development to the extent of depletion of natural resources. In the name of development humans have damage the life supporting system of human biology and nature's ecology. The limited natural resources and unlimited human wants have disturb the natural balance between the environment and development. Using automobiles and transportation is also result of human wants. For some people use it for their basic needs, some use it for economic gain and some use it for status symbol. Uncontrollable and irrational use of automobiles and transportation adversely affects our natural environment. Effects of automobiles on environment is the main topic of the present research work. Environmental problems since last four decades have become a matter of not only national concern but of international importance. Conservation and protection of environment is essential for survival of human beings on this planet.

We can not deny the fact that developed countries are mainly responsible for most of the environmental degradation. They are industrially and technologically are advanced as compared to third world countries and therefore they negatively contributed more in various kinds of environmental pollutions. Now developed countries show their concern for environment conservation and protection. They want and try to limits the progress and development of developing countries because development by various anthropogenic activities are main cause of various environmental problems which each and every country in the world is facing right now. Their intentions are good for solving environmental issues but the ways developed countries are trying to control different environmental crisis are not proper. Developing countries need development and developed countries should help them in such a

way that development of developing countries must be sustainable. Development should not affect the needs of future generations and such development is known as sustainable development. We must fulfill the needs of the present generation without compromising the needs of the future generations. We have some obligations towards our future generations therefore we should not pollute and degrade our natural environment so that future generations can also enjoy their life happily in the same manner we are enjoying and using different natural resources like clean air, pure water, fertile soil, favorable climate, healthy food etc.

Climate Change, Global Warming and Green House Gasses

Climate is the general average pattern of weather in a place over a period of years. Changes in environment are either natural or man made. Natural changes have very low impact on environment but man made changes have greater and more serious impact on the climate. Anthropogenic activities are leading to an unprecedented acceleration in climatic changes. It is predicted that earth's temperature will rise 1.5 - 4.5⁰ C. There are so many reasons for these accelerated changes. Some gasses are continuously increasing in atmosphere due to human activities such as fossil fuel burning, automobiles, deforestation etc. If these emissions rise continuously in the atmosphere then definitely there will be substantial changes in the climate. Because of climate change global warming is increasing. Global warming is dependent upon the amount of different gasses present in our atmosphere. Now a days because of anthropogenic activities green house gasses (CO₂, SO_x, NO_x, CO, CFC_s) are releasing in atmosphere in very huge quantity. All these gasses are responsible for continuous rise in temperature. This phenomena of gradual increase in the temperature of earth's atmosphere is termed as global warming. Green house gasses such as CO, CO₂ and SO_x are responsible for climate change and these gasses release from vehicular emission or transportations or automobiles.

Today the word global warming is known to all. It is effect of anthropogenic activities. Anthropogenic activities means man made or human activities. Automobiles or transport industry is one of the main man made activities which is responsible for global warming. Global warming means increase in normal temperature of earth's surface and atmosphere is continuously increasing year by year specially after industrial revolution. Global warming results in melting of ice glaciers. Melting of glacier ice is the main cause of high sea water levels. Low altitude regions of earth get more rains and there is a danger that territorial land of some countries specially those are located in ocean in low altitude like Maldives get submerged in water after few years due to rise in sea water level. Due to high intensity of rains flash floods will also increase. Due to rise in earth's temperature those regions having low moisture in soil are not able to produce effectively and there is decrease and low agricultural

crop productivity. Because of global warming there is a change in atmospheric phenomena like changes in wind pattern, changes in weather and tornadoes, hurricanes and storms are increasing and their intensity is also increasing.

Carbon monoxide, carbon dioxide, and methane together known as greenhouse gasses. These three above green house gasses and water vapors are primarily responsible for green house gas effect. Some amount of solar radiation is released in space but due to the presence of these gasses in the atmosphere some amount of solar radiation come back to earth's land surface. Green house is a kind of phenomena that results when solar radiation is trapped in the earth surface and atmosphere due to these powerful greenhouse gasses and consequently it leads to increase in earth's temperature that ultimately results in global temperature rise, global warming, changing in weather conditions, melting of glaciers and finally rise in ocean water level that creates threat for some countries like Maldives.

Atmosphere and Air Pollution

Atmosphere is the layer of mixture of gasses that covers our entire earth. In atmosphere clean air contains approximately 78% nitrogen, 21% oxygen and remaining 1% consists mixture of gasses like carbon dioxide, argon, helium, nitrous oxide etc. Without the atmosphere, there would be no clouds, winds or storms and hence no weather. Without the atmosphere life would be impossible because it is the source of oxygen and carbon dioxide. It helps in maintaining habitat temperature on the earth. Water vapours is also present in the lower atmosphere. Its amount is very small in the atmosphere but its importance is very great because without water vapours there would be no water on this earth. If air gets polluted by automobiles and if we live and breath in that polluted air then we will suffer from various problems specially respiratory issues. Air pollution means undesirable changes in the air due to addition of something which is hazardous and detrimental. The degradation of air quality of natural atmospheric condition due to pollutants is known as air pollution. In India, almost about 65-70% of air pollution is resulting from vehicular emissions.

Clean and pure air in our atmosphere is very essential because of two main reasons. Firstly, all living beings breath air for respiration so we cannot imagine healthy life without clean and pure air. Secondly, air is directly related to water or precipitation or condensation. We know about water cycle that water evaporates and become gaseous and then density of huge amount of gases results in raining or water. So if air is polluted water which we will get from precipitation will also be polluted as in the case with acid rain. We also can not imagine our life without pure water. Be it a life on land or life below water both of the life forms requires normal pure water. We humans, other terrestrial animals, plants and birds almost all living

beings consume water in some way or another. In this way air and water is related. But those anthropogenic activities specially automobiles are affecting air and water very badly.

Air Pollutants and Its Effects

Pollutants are those gasses or substances which are directly or indirectly responsible of different kinds of pollution because they mix and adds with other natural gasses or substances and disturb the original balance of air, water, soil etc. The air we breath all are polluted. Environmental destruction and pollution has seriously threatened the human life, health and livelihood. Automobile sectors or transport industry is responsible for release of various types of harmful gases in the atmosphere in very abundant quantity. Some of the main gasses and elements which are responsible for environmental degradation particularly pollution of air are lead Pb, carbon monoxide CO, carbon dioxide CO₂, methane CH₄, nitrogen oxides NO_x, nitrous oxide N₂O, chlorofluorocarbons CFCs, per fluorocarbons PFCs, heavy metals like zinc, chrome, copper and cadmium and particulate matters such as dust, ash etc. Among the above mentioned gasses nitrous oxide is mainly responsible for the depletion of stratospheric ozone layer which protects animal beings including us and natural vegetation from harmful effects of ultraviolet rays of the sun. Gasses like carbon monoxide, nitrogen dioxide NO₂, sulphur dioxide SO₂ and nitrogen oxides and few other chemicals are cause of acid rain. Acid rain adversely affects on agricultural crop production, forest decline, marine life, construction. We all are aware about effects of acid rain on Taj Mahal. It damaged white marbles of Taj. Acid rain is came to be called as cancer for white Taj marbles. Due to acid rain white marbles looks yellowish.

Smog is one of the pollutants which is a mixture of smoke and fog. Photochemical or Los Angeles smog is one of the types of smog which is due to the presence of oxides of nitrogen in the atmosphere, formed as a result of vehicular exhaust. It is the result of chemical reactions involving ozone, nitrogen oxide, hydrocarbons and peroxyacetyl nitrate PAN in the presence of sunlight. It irritates eyes and lings, causes cracking of rubber and extensive damage to vegetation or plant life. Tropospheric or ground level ozone is another phenomena related to air pollution. It is formed by photochemical reaction between volatile organic compounds VOCs and nitrogen oxides. Stratospheric ozone is beneficial and important for the existence of life forms on earth. But tropospheric ozone is a kind of air pollution and man made activities are responsible for this. Acid rain is another dangerous phenomena which is caused by chemical reaction among sulphur dioxide, nitrogen oxides, water and oxygen. Acid rain has many harmful effects but it greatly damages lakes, streams, wetlands and other aquatic environments. Acid rain makes water more acidic makes it not suitable for drinking and creatures and organisms living in water bodies also find difficult to survive when it becomes acidic due to acid rain. Acid rain also harm and damages natural vegetation, forests especially those at

higher elevations. It decreases essential nutrients from the soil and increases aluminium in soil which creates difficulty for plants and trees to get water from soil.

If take a look at what are the different effects of automobiles on human health then we find that ground level ozone, lead and carbon monoxide are main pollutants which are responsible for various health issues in humans. Main source of ground level ozone is vehicular exhaust and it negatively affects on lung functions leading to asthma, chronic bronchitis etc. Lead is used as anti-knocking in petrol which adversely affects on central nervous system CNS and RBCs development. Due to incomplete combustion of fossil fuels carbon monoxide is produced as a air pollutant which causes breathing problems and it also reduces oxygen carrying capacity of blood.

Environment and Law

Environment means conditions that surround someone or something. It also means the conditions and influences that affect the growth, health, progress, etc., of someone or something. Now it has been said that human beings are natural environments' worst enemy. The environment proves that all human activities are interconnected with the nature. In India The Air (Prevention and Control of Pollution) Act, 1981 controls and regulates emissions from automobiles and industrial plants. It is important to note that the term prevention in the above act refers to new sources of pollution and the term control refers to the existing sources of pollution. Law is regarded as a means of controlling human conduct. The first obligation of legal system is to eliminate the sources of pollution and secondly is to improve appropriate sanction against polluters. The problem of environmental pollution is now arriving at a dangerous proportion throughout the world and global concern is discernible to protect environment. Environmental degradation is adversely affecting on human health. Environment Protection Act 1986 is one of the most important law which come into existence after Bhopal Gas Tragedy 1984 for environment conservation and protection and to avoid industrial accidents in future.

Now environmental pollution is a global concern. In Millennium Development Goals to ensure environmental sustainability was one of the goal out of eight goals. In Sustainable Development Goals main emphasis was given to environmental related issues like to take urgent action to combat climate change and its impacts, conserve and sustainably use of the oceans, seas and marine resources for sustainable development, protect, restore and promote sustainable use of terrestrial ecosystems.

Some initiatives are taken by the authorities in last few years for reducing the negative effects of automobiles on environment like reduction of sulphur in diesel, use of clear fuel in such as

CNG compressed natural gas, implementation of Bharat Stage IV and VI also known as BS IV & VI in 2017 and 2020 respectively. In 2015 Delhi High Court declared Delhi as gas chamber because of severe condition of air. In order to bring down air pollution in Delhi state government started odd even formula in 2016 for vehicle in which on even date vehicle with even numbers are allowed on road and on odd date vehicle having odd numbers can run on the roads. In order to reduce vehicular pollution government decided jump from BS IV to VI directly. The main aim behind implementing the BS VI by Union Ministry of Transport is reducing sulphur level in air. BS VI is most advanced emission standard for automobiles. Now on board diagnostic OBD are mandatory for all vehicles. The OBD unit can find out areas of malfunction by means of default code stored on computer. Now a days electronic vehicle EV is a very good option if we want to reduce transportation's impact on climate change, air pollution, and other environmental issues. Concerned authority department can set the standards for emission of air pollutants from automobiles.

In *M.C. Mehta v Union of India (CNG Vehicle Case AIR 2002 SC 1696)* the Supreme Court observed that there is a need to maintain balance between the needs of transport and the need to protect the environment and we should try to reverse the large scale degradation that has resulted over the years. Court also recommend that we must give priority to environment over economic issues. The court also observed that “the emission norms stipulated by the Government have failed to check air pollution, which has grown to dangerous levels across the the country.”

Stockholm Declaration of 1972 was perhaps the first major attempt to conserve and protect the human environment at the international level. As a consequence of this declaration Indian Parliament inserted two articles i.e., 48A and 51A accordingly in the Constitution. In Indian constitution there are two important articles related to environment conservation and protection. Firstly, Part IV of Indian Constitution that is directive principles of state policy DPSP and it's Article 48-A goes like this that The State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country. Secondly, Part IV-A that is Fundamental Duties FDs and Indian citizens' seventh duty (g) goes like this that It is a duty of all citizens to protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures. The Auto Fuel Policy suggested by the expert committee headed by Dr. R.A. Mashelkar includes recommendations on auto fuel's quality, vehicular emission norms and its related issues for the country as a whole. It also recommended the introduction of low sulphur diesel, unleaded petrol and low-benzene gasoline in a phased manner along with the promotion of alternative fuel such as compressed natural gas. Indian government launched National Action Plan on Climate Change

NAPCC in 2008 for tackling climate change. Climate change is the result of anthropogenic activities and automobiles or transportation are one of the man made activities so in this way automobiles are also responsible for climate change phenomena along with other anthropogenic activities.

In India, Vehicular emission is controlled by the Motor Vehicle Act, 1988. The Central Government has the power to regulate the construction, equipment and maintenance of motor vehicles and trailers with respect to several matters, including emission of smoke, visible vapour, sparks, ashes, grit or oil and provisions for transportation of goods of dangerous or hazardous nature to human life , and standards for the emission of air pollution. In 1989, the Central Motor Vehicles Rules introduced nation wide emission levels for the petrol and diesel engine vehicles.

Solutions

We should promote and use alternative fuels such as CNG/LPG and electric vehicles, hybrid and battery based E-rickshaw and buses. Apart from these, we must also promote non-motorised transport like cycle rickshaw, cycle and walking. We can also use odd even formula for long time. Public transport system should be encouraged like metro, bus, local train, etc. because it reduces our dependency on private vehicles. Good quality urban roads and flyover projects should be made because dedicated bus lanes reduce congestion and hence emission can be reduced. Tree plantation should be encouraged and practiced by everybody because it reduces carbon dioxide and other harmful pollutants. Public awareness should be spread and people should be educated regarding pollution by automobiles so that it can be reduced to a significant level. Strict laws should be made related to automobiles and must be implemented effectively as well.

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