EVS Assignment

Q.1. Discuss the impacts of India's growing population on Environment. Also describe the role of the media in generating environmental awareness among people.

Ans. <u>India's growing population</u> :

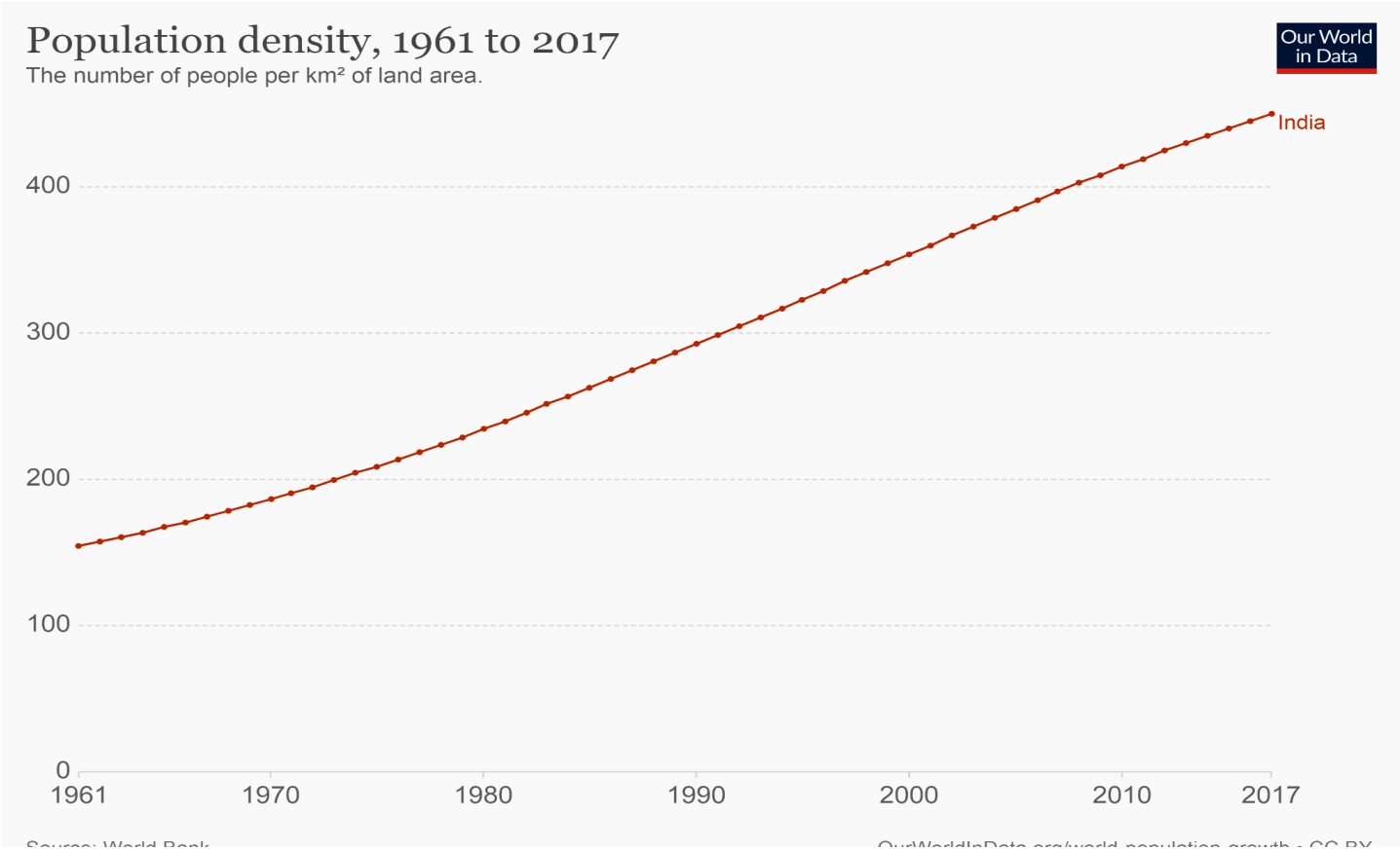
India is the second most populated country in the world with nearly a fifth of the world's population. According to the 2019 revision of the World Population Prospects the population stood at 1,352,642,280.

Between 1975 and 2010, the population doubled to 1.2 billion, reaching the billion mark in 1998. India is projected to surpass China to become the world's most populous country by 2024. It is expected to become the first country to be home to more than 1.5 billion people by 2030, and its population is set to reach 1.7 billion by 2050. Its population growth rate is 1.13%, down from 2.3% from 1972 to 1983, ranking 112th in the world in 2017.

India has more than 50% of its population below the age of 25 and more than 65% below the age of 35. In 2020, the average age of an Indian is 29 years, compared to 37 for China and 48 for Japan; and, by 2030, India's dependency ratio will be just over 0.4 . However, the number of children in India peaked more than a decade ago and is now falling. The number of children under the age of five peaked in 2007, and since then the number has been falling. The number of Indians under 15 years old peaked slightly later (in 2011) and is now also declining.

There are some graphs which help you to understand the population growth between 1961 - 2017.

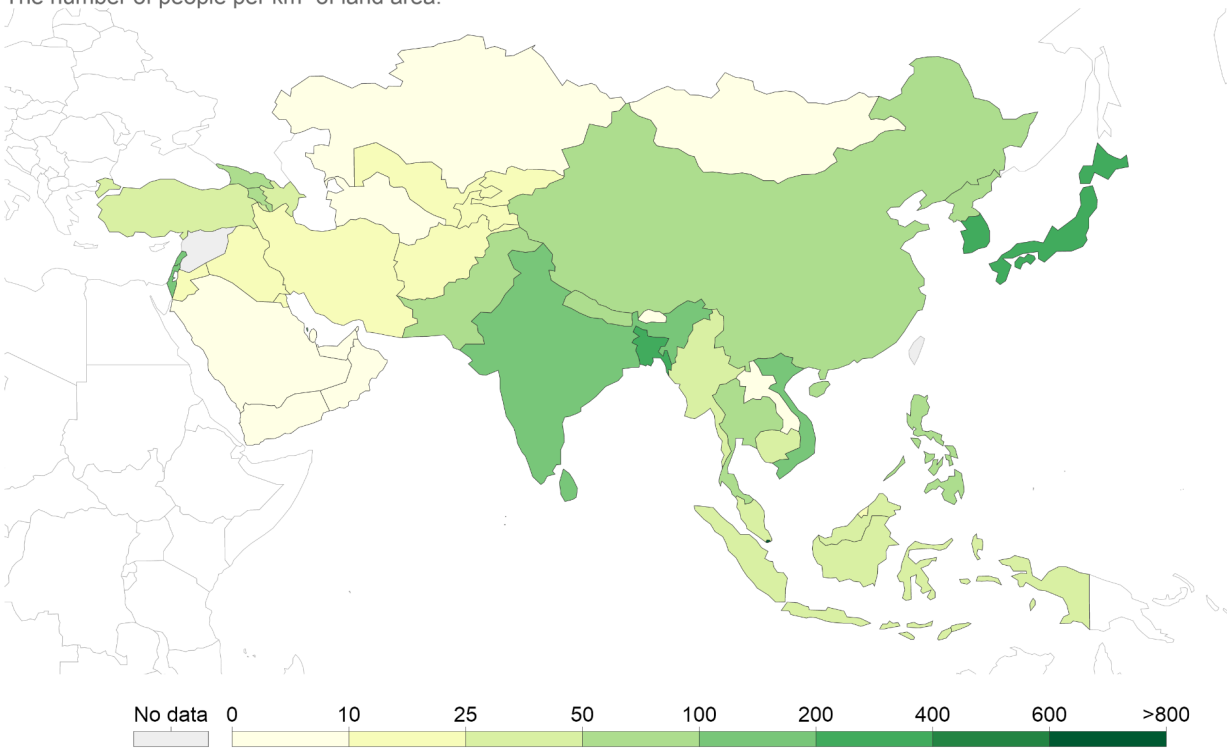
The following first graph shows us about the increment of population density of India. In 1961, India's population density was less than 150 persons / km^2 but now it is 462 persons / km^2.



In the next two following graphs,you are able to compare the differences of population density of India between 1961 - 2017 via map.

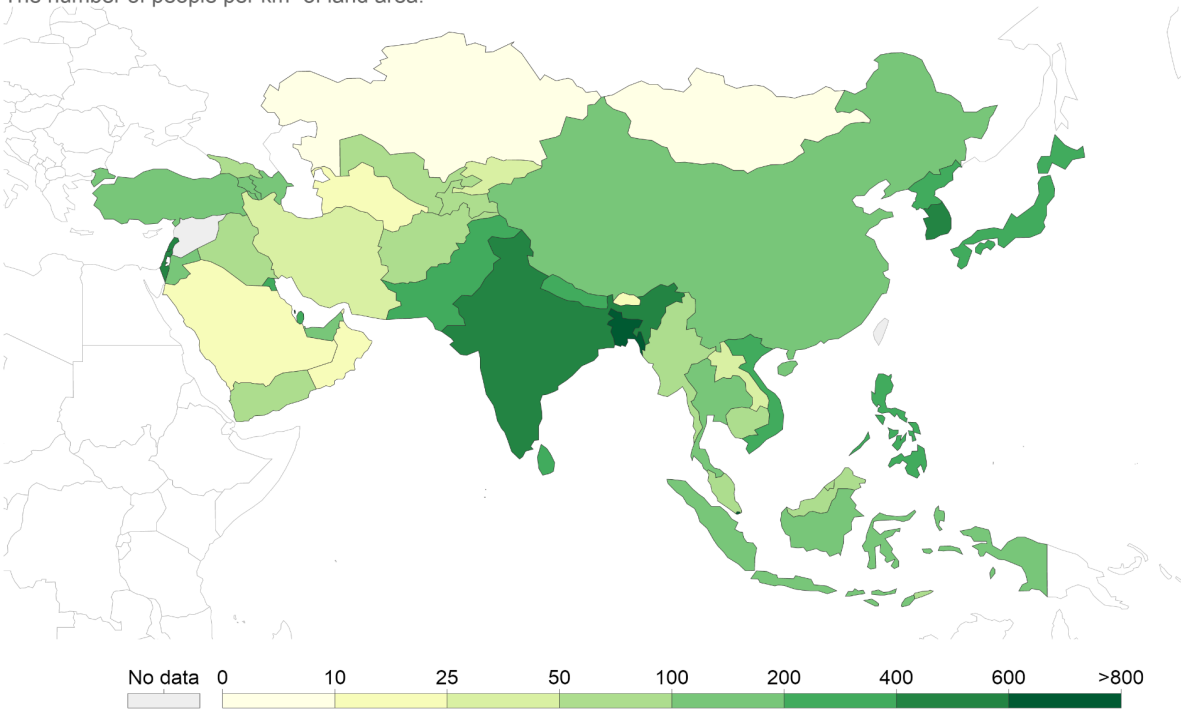
Population density, 1961

The number of people per km² of land area.



Population density, 2017

The number of people per km² of land area.



Growing Population impacts on Environment

The rapid increase of the human population is putting an incredible strain on our environment. While developed countries continue to pollute the environment and deplete its resources, developing countries are under increasing pressure to compete economically and their industrial advancements are damaging as well. The demands that this growth places on our global environment are threatening the future of sustainable life on earth. One of the largest environmental effects of human population growth is the problem of global warming. Some scientists fear that global warming will lead to rising sea levels and extreme weather conditions in the future. In order to support the growing population, forests are being destroyed at an alarming rate. Humans also continue to put a great demand on the natural resources of our planet. Many non-renewable resources are being depleted due to the unrestrained use of fuel and energy. Many parts of the world also suffer from a shortage of food and water. The growth of population puts larger demands on our already limited resources. The environment on earth is suffering from the growth of the global population. The depletion of resources and biodiversity, the production of waste, and the destruction of natural habitats are serious problems that must be addressed in order to ensure that life on earth will be sustainable throughout the next century.

Population growth and economic development are contributing to many serious environmental problems in India. These include pressure on land, land/soil degradation, forests, habitat destruction and loss of biodiversity, changing consumption patterns, rising demand for energy,

air pollution, global warming and climate change and water scarcity and water pollution.

Pressure on land :

India faces the most acute pressure on agricultural land. Today every million hectares of land supports 7.27 million people. Forty three percent of the land is under cultivation, one of the highest in the world. A change in land utilization pattern implies an increase or decrease in the proportion of area under different land uses at a point in two or more time periods. Over the past fifty years, while India's total population increased by about 3 times, the total area of land under cultivation increased by only 20.27 percent from 118.75 million hectares in 1951 to 142.82 million hectares in 2001.

Most of this expansion has taken place at the expense of forest and grazing land. Despite past expansion of the area under cultivation, less agricultural land is available to feed each person in India. It shows variations in land use and a narrow range of fluctuations in the proportion of net sown area to total land in the country from 1951 to 2001. Out of a total geographical area of 329 million hectares, only 306 million hectares is the reporting area (the rest being unadministered for various reasons). The land for non-agricultural uses (housing, industry and others) increased from 9.36 million hectares in 1951 to 22.97 million hectares in 2001.

More than 19.4 million hectares are snow bound and remote leaving only 237 million-hectare for agriculture, forestry, pasture and other biomass production. The area under cultivation had increased by about 30 percent until 1981 and thereafter depicts marginal decline. The net sown area increased from 119 million hectares in 1950-51 to 140 million

hectares in 1970-71 mostly through reclamation of old fallow and culturable wastelands and 7 diversion of groves. The net area sown has increased only marginally from 140 million hectares in 1970-71 to 141 million hectares in 2000-2001, indicating that the private efforts have peaked and the intervention of the Government is required for further land reclamation.

The extent of agricultural intensification and extensification characterized by increase in cropping and irrigation intensity and higher use of chemical fertilizers, pesticides and insecticides. The process of agricultural extensification and intensification is leading to land degradation, overexploitation of underground water resources, increased use of chemical fertilizers leading to eutrophication and water pollution. Agricultural intensification because of increasing cropping intensity, irrigation intensity and excessive use of chemical fertilizers resulting in water logging, salinization and alkalinization of croplands and eutrophication of water bodies and ill health of oceans and thus reductions in biodiversity.

Land / Soil Degradation :

Direct impacts of agricultural development on the environment arise from farming activities, which contribute to soil erosion, land salinization and loss of nutrients. The spread of the green revolution has been accompanied by over exploitation of land and water resources and use of fertilizers and pesticides have increased many folds. Shifting cultivation has also been an important cause of land degradation. Leaching from extensive use of pesticides and fertilizers is an important source of contamination of water bodies. Intensive agriculture and irrigation contribute to land degradation particularly salination, alkalization and water logging. It is evident that most of the

land in the country is degrading, thus affecting the productive resource base of the economy.

Out of the total geographical area of 328.7 million hectares, 175 million hectares are considered to be land-degraded areas. Water and wind erosion is the major contributor of 141.3 million hectares to soil erosion, with other factors like water logging 8.5 million hectares, alkali soil 3.6 million hectares, acid soil 4.5 million hectares, saline soil including coastal sandy areas 5.5 million hectares adding to the situ degradation. While soil erosion by rain and river in hill areas causes landslides and floods, deforestation, overgrazing, traditional agricultural practices, mining and incorrect siting of development projects in forest areas have resulted in opening up of these areas to heavy soil erosion. Ravines and gullies 8 reported 4 million hectares; area subject to shifting cultivation reported 4.9 million hectares and riverine and torrents erosion due to floods and eutrophication due to agricultural runoff reported 2.7 million hectares. The increasing intensification and extensification also results in salination, alkalization and water logging in irrigated areas of the country. For achieving and maintaining food security, sustainable forestry, agricultural and rural developments controlling land/soil erosion is very much necessary.

Habitat destruction and loss of biodiversity :

Protection of earth's biological diversity is an important goal in its own right. Biodiversity has direct consumptive value in food, agriculture, medicine, industry etc. It also has aesthetic and recreational value. The greatest threat to biodiversity is not destruction of plants and animals per se, but rather the destruction of their habitat. India is one of the 12 mega-biodiversity countries of the world. From about 70 percent of the total geographical area surveyed so far 46,000 plant species and

81,000 animal species representing about 7 percent of the world's flora and 6.5 percent of the world's fauna have been described. Population growth leads to expanding human settlements and increasing demand for food, fuel and building materials. Modernization of agriculture also threatens potentially valuable local crops.

Biodiversity the world over is in peril because the habitats are threatened due to such development programmes as creation of reservoirs, mining, forest clearing, lying of communication and transport networks etc. It is estimated that in the worldwide perspective slightly over 1000 animal species and subspecies are threatened with the extinction rate of one per year, while 20,000 flowering plants are thought to be at risk.

Global warming and climate change :

The country's large population and rapidly increasing energy use plays an important and growing role in global warming. Global warming can have major physical, environmental and socioeconomic consequences, which can be both positive and negative. The estimation of these impacts is complex and marked with uncertainties. Climate change would cause changes in 14 precipitation patterns, ocean circulation and marine systems, soil moisture, water availability, and sea level rise. These would make an impact on agriculture, forestry and natural ecosystems like wetlands and fisheries. Also with rising temperatures, and subsequent increasing heat stress and alternation in patterns of vector-borne diseases, the global population would be more vulnerable to health problems, causing disruptions in settlement patterns and large-scale migration. All these would have significant socio-economic consequences.

Water scarcity and water pollution :

Water use in India has increased over the past 50 years. Out of the total annual freshwater withdrawals, the largest share goes to agriculture - at 92 percent. Industrial use accounts for another 3 percent and domestic use 5 percent. However, not all the water abstracted is effectively used, there are sizable losses in conveyance and application of irrigated water, a large part of water used by industry and domestic purposes is returned to the streams as effluent waste; and most of the water drawn by power station is used for cooling purposes and is available for reuse. The use of fresh water increased rapidly. The amount of water available per person has declined in recent decades - primarily because of population growth and water scarcity is projected to worsen in the future. The water pollution in India comes from three main sources: domestic sewage, industrial effluents and run off from activities such as agriculture. Major industrial sources of pollution in India include the fertilizer plants, refineries, pulp and paper mills, leather tanneries, metal plating and other chemical industries. Levels of solid wastes increased in rivers and lakes and other water systems are also heavily polluted due to the intrusion of solid wastes. Largely because of widespread pollution, access to safe drinking water remains an urgent need as only 70.1 percent of the households in urban areas and 18.7 percent in rural areas receive organized pipe water supply and others have to depend on surface and groundwater which is untreated.

Most of the applied pesticides and fertilizers, irrespective of crop, applicator or the formulation used, ultimately finds its way into the soil. Before pesticides are completely inactivated, they may adversely affect the functioning of non-target microbes and other forms of 15 life inhabiting the soil. They may also be taken up by the plants or get translocated in the aquatic system by leaching or run-off, thus

contaminating the plankton, fish, invertebrate and other forms of life using their water. Pesticide residues in food items have been a matter of considerable concern. Even small quantities of these residues ingested daily along with food can build up high levels in the body fat. The long term effects of these residues in the human body include carcinogenicity, reduced life span and fertility, increased cholesterol, high infant mortality and varied metabolic and genetic disorders.

Traces of pesticides and fertilizers from the fields are washed into the nearest water bodies at the onset of monsoons or whenever there are heavy showers that add to water pollution. Consumers are affected by agricultural concomitants such as pesticides and fertilizers that run-off from fields into rivers. Polluting a river is dangerous because generally, rivers are the primary source of drinking water for towns and cities downstream of the point of pollution. The New Agricultural Policy seeks to sensitize the farming community with the environmental concerns. The policy lays that concerted efforts will be made to pool, distil and evaluate traditional practices, knowledge and wisdom and to harness them for sustainable agricultural growth.

The increasing river water pollution is the biggest threat to public health. The diseases commonly caused due to polluted water are cholera, diarrhea, hepatitis, typhoid amoebic and bacillary, dysentery, guinea worm, whereas scabies, leprosy, trachoma and conjunctivitis are some of the diseases associated with water scarcity. All these could be attributed to the rapidly increasing population and lack of water resources. Inadequate access to safe drinking water and sanitation facilities leads to higher infant mortality and intestinal diseases. More than one million children died due to diarrhea and other gastrointestinal disorders in the 1990s. In addition, around 90 lakh cases of acute diarrhea diseases have

been reported in India, Uttar Pradesh reporting the highest number of cases (Central Bureau of Health Investigation, 1996). It is estimated that 73 million workdays are lost every year due to water related diseases. The cost of treating them and the loss in production amount to Rs. 600 crores a year.

Air pollution :

Indian cities are among the most polluted in the world. Air in metropolitan cities has become highly polluted and pollutant concentrations exceeds limit considered safe by the World Health Organization (WHO). Suspended particulate levels in Delhi are many times higher than recommended by the World Health Organization (WHO). The urban air pollution that has grown across India in the last decade is alarming. Some of the most important air pollutants are residual suspended particulate matter (RSPM), suspended particulate matter (SPM), nitrogen di-oxides (NO2), carbon monoxide (CO), lead, sulfur dioxide (SO2) etc.

The main factors accounting to urban air quality deterioration are growing industrialization and increasing vehicular pollution, industrial emissions, automobile exhaust and the burning of fossil fuels kills 13 thousands and lives many more to suffer mainly from respiratory damage, heart and lung diseases. In the countryside, nitrates from animal waste and chemical fertilizers pollute the soil and water, and in the cities, the air is contaminated with lead from vehicle exhaust. In India's largest cities - Mumbai and Delhi - about one-half of children under age 3 show signs of harmful exposure to lead, defined as to or more micrograms of lead per deciliter of blood. The illness and premature deaths due to ambient suspended particulate matter (SPM) in the air in mega cities of Calcutta, Chennai, Delhi and Mumbai have risen

significantly in less than five years (Brandson and Honmon, 1992). The indoor air pollution may pose an even greater hazard for human health. Cooking and heating with wood, crop residues, animal dung, and low-quality coal produces smoke that contains dangerous particles and gases. When fuels such as these are burned indoors, using inefficient stoves and poor ventilation, they can cause tuberculosis, other serious respiratory diseases, and blindness (Mishra, Retherford and Smith, 1999). In fact, indoor air pollution from cooking and heating with unsafe fuels has been designated by the World Bank as one of the four most critical environmental problems in developing countries.

India is one of the most degraded environment countries in the world and it is paying heavy health and economic price for it. According to a World Bank sponsored study, estimated environmental damage in the year 1992 amounted to about US $ 10 billion or Rs. 34,000 crores, which is 4.5 % of GDP. Urban air pollution costs India US $ 1.3 billion a year. Water degradation leads to health costs amounting to US $ 5.7 million every year, nearly 60 percent of the total environmental cost. Soil erosion affects 83 to 163 million hectares of land every year. Beside, land degradation leads to productivity loss equal to US $ 2.4 billion or 4 to 6.3 percent of agricultural productivity every year.

Role of Media in Environmental Awareness

The word "Environment" is derived from the French word "Environ" which means "Surrounding". Thus literally means the environment is everything around a living being, specially the circumstances of life of people or society in their life conditions. It comprises the set of natural, social and cultural values existing in a place and at a particular time, that influence in the life of the human being and in the generations to come. i.e., it is not only the space in which life develops, but it also includes living beings, objects, water, soil, air and the relations between them as well as intangibles like culture.

Environmental awareness is to understand the fragility of our environment and the importance of its protection. Promoting environmental awareness is an easy way to become an environmental steward and participate in creating a brighter future for our children. To define environmental awareness we must first understand the environmentalist movement. Environmentalism is an ideology that evokes the necessity and responsibility of humans to respect, protect, and preserve the natural world from its anthropogenic (caused by humans)afflictions.

Environmental awareness is an integral part of the movement's success. By teaching our friends and family that the physical environment is fragile and indispensable we can begin fixing the problems that threaten it.

Environmental awareness is a strategic communication process to promote the knowledge of the environment, keep people up to date

about catastrophic impacts of human development and help them to know about sustainable development. For the sake of our world, clearly Environmental awareness plays a critical role for creating interest in the environment.

Before you can begin promoting environmental awareness in your own community you must first make sure that you have a thorough understanding of environmental issues. Staying up to date on environmental news and reading comprehensive books about environmental threats are both great resources, but if you're the type of person who prefers a more interactive approach, attending environmental seminars is a great option.

The role of the media is very important in shaping public awareness about global climate change and associated actions. When we discuss the role of the media, we focus on three key issues, to inform, to educate and to entertain. Traditionally, there have been tools like radio, television and newspapers which have been playing an important role for spreading awareness among the people for climate change and environment protection at a faster rate than personal contacts. Further they have been enriched by the production and distribution of printed materials such as books, magazines and brochures which has helped in transfer of new and current awareness whereas radio and television are important tools for quick information.

The different types of media can be categorized as:

•Print Media which includes newspapers , Magazines and advertising.
•Broadcast Media which include Television and Radio.
•Social Media which includes Social sites and the internet.

<u>Awareness campaign by Newspapers and Magazines</u> :

Dainik Bhaskar campaign- Daink Bhaskar a leading hindi newspaper of India started Jal Bachao Abhiyan among its readers in different states and it had a great impact on readers. “Jal Satyagraha” initiative is being organised for a decade in the month of April and May by Dainik Bhaskar as a special drive in summers. The objective of the campaign is to create awareness and invoke individuals to 'Save Water'. The campaign encourages people to take a pledge; inducing them to save 15% water in their daily usage.

The initiative received an “ Award of Honor ” from Pawan Kumar Bansal, Union Cabinet, Minister of Parliamentary Affairs and Water Resources. To promote this cause the group undertook various activities and organised a conference with experts from UNICEF, UNESCO and International Commission for Irrigation and Drainage. The initiative reaches out to individuals via ads, full page editorial content on ways to save water.In the next stage of Jal Satyagraha Campaign a detailed coverage was carried out in all editions under a central plan, in which awareness on scarcity of water and solution to it were covered. It included coverage on demand and supply of water at city level, need of long term planning to meet the water demand, condition of water network in cities need of its maintenance and cleaning and maintenance of ponds, wells and baories. Neha Mawani associated with this Campaign says, Water is precious and nature has been more than bountiful in India. But today conditions are different. Most of the lakes, rivers, wells and old baories are drying. We have used this most precious gift of nature recklessly by not giving a thought on recharge and maintenance of water resources.

Similarly, environmental magazines like “Down to Earth” had been found to cover a broad variety of environment related topics (ranking from policy to science, from local to global level) and their scientific background. Over the years the magazine has informed and inspired people about environmental threats facing India and the world -- a dimension underplayed in mainstream media. Circulation figures are not a true indicator of the wide reach of the magazine: DTE has become a reading habit in 400 out of about 500 districts of the country - more than any other Indian newspaper or magazine. DTE’s sphere of influence is not just limited to India.

Numerous readers across the world rely on the magazine for a comprehensive view from the South on the most critical issues of human existence. The online version of DTE is an effort to reach more people and to use all the interactive elements that the new medium has to offer.

Radio :

Radio is the cheapest media and most easily accessible mode of information and entertainment throughout the country. It has been noted that Delhi FM was broadcasting two weekly programs on environment, “Kinare-Kinare” and “Ao Dilli Savaren” on being motivated by the Ministry of Environment & Forests. At the national level, the news on environmental aspects are very scarce and if they are broadcast they are most often at the regional level.

Awareness Campaign by Television :

The nation's leading TV channel group NDTV has launched a unique campaign in April 2008 “ NDTV Toyota green campaign ”. This constant 24-hour program has stars and celebrities participating in this

program. It was an effort for people's conscious about environmental issues.

The campaign was with Nobel Prize winner " Dr. R.K. Pachauri ", then Environment Minister " Jairam Ramesh " and many film stars. After the huge success of the NDTV-Toyota environment campaign Greenathon I & II, NDTV in partnership with Toyota announced the Green Awards to encourage, acknowledge and award the Champions of the Earth for environmental leadership (globally) contributing most towards protecting our environment.

Zee Media Corporation Ltd., launched the fourth edition of India's biggest environment awareness initiative "My Earth My Duty". My Earth My Duty has proven to be an essential platform provided by an Indian media house in bringing behavioural change in Indian citizenship, especially youth. The initiative has been able to sensitize and encourage people to take adequate steps to conserve the Earth and more so for our children and grandchildren.

Zee Media has partnered with Ministry of Youth – National Service Scheme (NSS) and Nehru Yuva Kendra Sangathan, Para-military forces-Border Security Force, Indo-Tibetan Border Police, Central Reserve Police Force, ETF, Brahma Kumari Samaj, Centre for Media Studies and others to maximize the reach and impact of the initiative. From issues like pollution to climate change, the media has been playing a vital role in creating awareness and raising issues to the pertaining topic of the environment. The media has been pivotal in covering the entire country of India in raising environmental issues like drought in Gujarat, Air pollution in Delhi, Groundwater level depletion in Chennai and pollution from coal mines in Jharia, west Bengal. It is still to be

confirmed that the role of mass media is one of the most important factors underlying the knowledge of environmental problems. This can only be true on the conditions that first, mass media are accessible to large proportions of the population, second, are spending some time on environmental issues and third, people are interested in information on ecological issues provided by the media so that they view or listen to the corresponding programs as well as read newspaper articles or other written publications dealing with environmental issues.

Awareness by Social Media :

The Internet's huge reach and accessibility make it one of the best resources for people all over the world to find information about climate change, environmentalism, and how to be green. The Internet is nowadays used more frequently to encourage environmental awareness as it provides opportunity to the people to respond and participate immediately. There are growing populations of youngsters that are ardent users of new media platforms.With Facebook or Twitter, youths today are very connected with each other and other global/local issues through the internet. Although not limited to youths only, social media platforms are also utilized by industry and government agencies as a preferred tool of communication with the general public.

Some of the digital campaigns :
#BeatPlasticPollution
#OnePlasticFreeDay
#PassOnPlasticEmoji
Keep Cup's #everydaychangemakers
Wastebuster & The Plastic Planet Challenge

Q.2. Discuss the advantages and disadvantages of Nuclear energy. With the help of a case study,describe its impact on Environment and Society.

Ans. Energy is defined by physicists as the capacity to do work. Energy is found on our planet in a variety of forms, some of which are immediately useful to do work, while oth- ers require a process of transformation. Energy has always been closely linked to man's economic growth and development. Present strategies for development that have focused on rapid economic growth have used energy utilization as an index of economic development. This index however, does not take into account the long-term ill effects on society of excessive energy utilisation.

For almost 200 years, coal was the primary en- ergy source fuelling the industrial revolution in the 19th century. At the close of the 20th cen- tury, oil accounted for 39% of the world's com- mercial energy consumption, followed by coal (24%) and natural gas (24%), while nuclear (7%) and hydro/renewables (6%) accounted for the rest. Among the commercial energy sources used in India, coal is a predominant source accounting for 55% of energy consumption estimated in 2001, followed by oil (31%), natural gas (8%), hydro (5%) and nuclear (1%).

In India, biomass (mainly wood and dung) ac- counts for almost 40% of primary energy sup- ply. While coal continues to remain the domi- nant fuel for electricity generation, nuclear power has been increasingly used since the 1970s and 1980s and the use of natural gas has increased rapidly in the 80s and 90s.

Types of Energy :

1. Non-renewable Energy : Earth minerals, fossil fuels (coal, petroleum)

2. Renewable Energy : Solar, Water, Biomass, Geothermal, Wind

Nuclear Energy :

Nuclear energy is the energy that holds together the nucleus of atoms. Atoms are the most simple blocks that make up matter. Every atom has in its center a very small nucleus. Fission is also used in nuclear power plants to make electricity.

Civilian nuclear power supplied 2,586 terawatt hours (TWh) of electricity in 2019, equivalent to about 10% of global electricity generation, and was the second-largest low-carbon power source after hydroelectricity. As of January 2021, there are 442 civilian fission reactors in the world, with a combined electrical capacity of 392 gigawatt (GW). There are also 53 nuclear power reactors under construction and 98 reactors planned, with a combined capacity of 60 GW and 103 GW, respectively. The United States has the largest fleet of nuclear reactors, generating over 800 TWh zero-emissions electricity per year with an average capacity factor of 92%. Most reactors under construction are generation III reactors in Asia.

Nuclear power has one of the lowest levels of fatalities per unit of energy generated compared to other energy sources. Coal, petroleum, natural gas and hydroelectricity each have caused more fatalities per unit of energy due to air pollution and accidents. Since its commercialization in the 1970s, nuclear power has prevented about 1.84 million air pollution-related deaths and the emission of about 64 billion tonnes of

carbon dioxide equivalent that would have otherwise resulted from the burning of fossil fuels.

<u>Advantages</u> :

- Plentiful fuel : 80 years of fuel (Jaduguda mines, Jharkhand) followed by Thorium.

- Cheap as compared to coal : Energy released is 10 million times greater than the amount released in burning a fossil fuel atom. (1 kilogram of Uranium-235 can generate over 24 million kilowatts of electricity. In comparison, 1 kilogram of coal generates about 8 kilowatts of electricity).

- Efficient Power Production

- Reliable (Most nuclear reactors are designed to operate for more than 40 years. Most of the reactors are nearing that age in perfect condition and projections are that they could still operate for another 20 years).

- No GreenHouse gases like methane and CO2,therefore no Global warming. India emits about 3 gigatonnes (Gt) of greenhouse gases each year.

- No poisonous emissions

- Non Polluting, cleaner fuel. Envtl. Impacts are relatively lighter.

- Electricity production can be lowered when good wind & solar energy is available and vice-versa.

- Dumping of waste in deep seas, less harmful as compared to coal where waste is released in air.

<u>Disadvantages</u> :

- Difficult to deal with Nuclear waste, a potential threat to Humans and Environment. They have to be isolated from human contact for up to a million years. any container or waste package will likely corrode and radioactive materials will percolate and contaminate ground water sources. France and Sweden, like other countries , have good technologies.
  Public resistance has halted multiple proposals to set up sites to bury nuclear waste in several countries.

- Possibility of major accident/accidents : Estimates conclude that somewhere between 15 000 and 30 000 people lost their lives in the Chernobyl aftermath and more than 2.5 million Ukrainians are still struggling.

- The atomic bombs' immediate effects devastated both cities (Hiroshima and Nagasaki) & killed between 150,000 and 246,000.

- Expensive to build the Power Plant- 17000 Cr, 22,000 Cr, 20,000 Cr. Kudankulam NPP unit 5,6 to cost 50,000 Cr. (2017)

- Construction cost of a Thermal Power Plant is 200 crs depending upon capacity generation.

- Possibility of stealing by terrorists :They could steal a bomb, build one, attack a nuclear facility, or make a “dirty bomb” from stolen radioactive material. Each year, more than 100 thefts and incidents involving radioactive materials are reported.

Impacts on Environment & Society

Carbon Dioxide :

Nuclear power has been called a clean source of energy because the power plants do not release carbon dioxide. While this is true, it is deceiving. Nuclear power plants may not emit carbon dioxide during operation, but high amounts of carbon dioxide are emitted in activities related to building and running the plants. Nuclear power plants use uranium as fuel. The process of mining uranium releases high amounts of carbon dioxide into the environment. Carbon dioxide is also released into the environment when new nuclear power plants are built. Finally, the transport of radioactive waste also causes carbon dioxide emissions.

Low Level Radiation :

Nuclear power plants constantly emit low levels of radiation into the environment. There is a differing opinion among scientists over the effects caused by constant low levels of radiation. Various scientific studies have shown an increased rate of cancer among people who live near nuclear power plants. Long-term exposure to low level radiation has been shown to damage DNA. The degree of damage low levels of radiation cause to wildlife, plants and the ozone layer is not fully

understood. More research is being done to determine the magnitude of effects caused by low levels of radiation in the environment.

Radioactive Waste :

Radioactive waste is a huge concern. Waste from nuclear power plants can remain active for hundreds of thousands of years. Currently, much of the radioactive waste from nuclear power plants has been stored at the power plant. Due to space constraints, eventually the radioactive waste will need to be relocated. Plans have been proposed to bury the radioactive waste contained in casks in the Yucca Mountains in Nevada.

There are several issues with burying the radioactive waste. Waste would be transported in large trucks. In the event of an accident, the radioactive waste could possibly leak. Another issue is uncertainty about whether the casks will leak after the waste is buried. The current amount of radioactive waste requiring long-term storage would fill the Yucca Mountains and new sites would need to be found to bury future radioactive waste. There is no current solution to deal with the issue of radioactive waste. Some scientists feel that the idea of building more nuclear power plants and worrying about dealing with the waste later has the potential of a dangerous outcome.

Cooling Water System :

Cooling systems are used to keep nuclear power plants from overheating. There are two main environmental problems associated with nuclear power plant cooling systems. First, the cooling system pulls water from an ocean or river source. Fish are inadvertently captured in the cooling system intake and killed. Second, after the water is used to cool the power plant, it is returned to the ocean or river. The water that is

returned is approximately 25 degrees warmer than the water was originally. The warmer water kills some species of fish and plant life.

Nuclear Power Plant Accidents and Terrorism :

According to the Union of Concerned Scientists, regulated safety procedures are not being followed to ensure that nuclear power plants are safe. Even if all safety precautions are followed, it is no guarantee that a nuclear power plant accident will not occur. If a nuclear power plant accident occurs, the environment and surrounding people could be exposed to high levels of radiation. The 2011 accident at the nuclear power plant in Fukushima, Japan is one of the worst nuclear disasters in history; the reactors were destroyed by a tsunami following a major earthquake. Terrorism threats are another concern that needs to be addressed. A satisfactory plan to protect nuclear power plants from terrorism is not in place.