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IMPACTS OF GLOBAL WARMING

Our global, regional and local environments are changing from many kinds of human activities e.g. **greenhouse gas emissions, changes in land surface use, deforestation, desertification, coastal zone activities, intensive agriculture and several others**. Climate warming by increasing greenhouse gas emissions is but one, perhaps the most complex, of these issues. These environmental changes may cause climate changes on corresponding scales in different measures. The likely consequences and different sectors of society need to be understood. Our response to these changes should be to promote suitable policies to remedy the possible adverse effect on specific sectors. There are several reasons for conducting climate change impact assessment e.g., modern society's increasing vulnerability to adverse climatic events (vulnerability to water stress, geological stress, human health problems, and economic development). The simple approach for assessing climate change impact follows the cause and effect pathway. At the same time, interactions of the society to meet

climate change threat also need to be examined for realistic assessment. For example, at the global level, changes in climate may lead to a shift in natural vegetation zone and this shift in itself may feedback on the climate.

Climate Change - The deforestation causes change in the local and global climate. The dry climate occurred due to deforestation in parts of India, peninsular Malaysia, parts of the Philippines, Ivory Coast and the Panama Canal area and perhaps also in southwestern China, northwestern Costa Rica and northern Tanzania. The forest loss and forest degradation increase carbon dioxide level in the atmosphere. The deforestation and degradation affect the annual absorption of 2.4 billion tones of CO₂ released by fossil fuel burning. The emission from deforestation was roughly two billion tons of carbon to the atmosphere per year.

The radiation budget is getting affected by increase in the land surface. It also affects the flow of wind, wind velocity, water vapour exchange. The rainfall pattern and intensity is affected. The deforestation increases drought and desertification, crop failures, melting of the polar ice caps, coastal flooding and displacement of major vegetation regimes.

Biodiversity and Habitat Loss - The deforestation is directly related to habitat destruction and fragmentation. Tropical forests are rich in biodiversity that act as habitat for two thirds of all known species and contain 65 per cent of the endangered species. The habitat loss also increases the human-wildlife conflicts.

Loss of Soil and Water Resources- The removal of forest reduces the evaporation and transpiration and directly affects the water cycle. This influences the water recharge in rivers, and other aquatic habitats. The ultimate result is the scarcity of water for drinking and irrigation. It increases the soil erosion as the forest roots no longer hold the soil and water infiltration. This result in runoff and siltation in water bodies,

wetlands and man-made dams. The heavy siltation increases river beds and cause flooding. The deforestation also creates environmental refugees in some parts of the world.

Urban Heat Island (UHI) Effect- The Urban Heat Island (UHI) effect has formed by the increase in temperature in urban areas than near surroundings by anthropogenic waste heat emissions. The temperature of urban areas has increased due to direct heat generation from human activities, removal of vegetation, construction of buildings, roads, pavement and other human transformations of the natural environment. So, the surface heat was accelerated by increase in latent heat flux by lack of evapotranspiration from trees and more radiation absorption by urban canopy. **Urban Flooding** The urbanization causes change in land use and microclimate, which affects hydrology and hydro-climatology of the area. This variability directly influence flood hazards in cities. The frequency and magnitude of floods increased due to climate change driven extreme precipitation and poor infiltration in cities.

URBANISATION also affects the rainfall pattern due to alteration in hydrometeorology. The cities in the coastal regions or near river deltas are more prone to floods with its urban characteristics as well as from changes in sea level, tides and large-scale runoff to rivers. Factors causing urban flood hazards are Meteorological factors (cyclonic storms, small-scale storms, temperature, and snowmelt) Hydrological factors (soil moisture level, groundwater level, natural surface infiltration rate, impervious cover, cross-sectional shape and roughness of channels, presence or absence of over bank flow, channel network, synchronization of runoffs from various parts of watershed and high tide impeding drainage); and Human factors aggravating natural flood hazards (land-use changes, surface sealing, increase in run-off, sedimentation, flood plain obstructing flows, inefficiency or non-maintenance of infrastructure, increase flood peak, climate change and urban microclimate). The urban floods are classified based on causal

factors into four categories: Local Floods, Riverine Floods, Coastal Floods, Flash Floods

PARTICULATES- The particulates or particulate matter (PM) refers to a suspended solid particles and liquid molecules in air. It includes inorganic dust, organic soot, smoke and liquid droplet that differ in size, composition and origin. These are either primary or secondary particles with natural and anthropogenic sources. The natural sources are wildfires, sea spray, and re-suspension of organic matter and human made sources are vehicular emissions, and wood smoke emissions from combustion of fossil fuels and biomass. The industries like brickworks, refineries, cement works; iron and steel making, quarrying, and fossil fuel power plants are sources of particulate matter. There are two types of PM: - PM₁₀: The particulate matter with less than or equal to 10 micrometers aerodynamic diameter. - PM_{2.5}: The particulate matter with aerodynamic diameter smaller or equal to 2.5 micrometers. These are fine particles which are inhalable form. It is also known as 'fine PM'. Particulate matter also includes aerosols emitted from the marine environment, mineral dust, biological aerosols and volcanic ash. The biogenic emissions, open burning of biomass, or fossil fuel act as sources for secondary organic aerosol (SOA) precursor gases. The primary biological aerosol particles (PBAPs) comprise viruses (0.05–0.15 μm), bacteria (0.1–4 μm), fungal spores (0.5– 15 μm) and pollen (10–30 μm) . The dry deposition act as sink for the particulates. The particulate matter can move long distance causing local, regional and global impacts. The particulates are directly related with health, visibility and radioactive forcing.

CONCLUSION: Population growth, industrialization and urban expansion increase anthropogenic emissions of greenhouse gases to the atmosphere and increases global temperature. The industrialization and urbanization are major agents of deforestation. The urban design reduced potential for evaporative cooling and causes urban heat islands

with a unique microclimate. The particulate matter emissions from vehicles and industries are high in urban areas. The desertification results from the warming up of the earth due to human pressure. The stratospheric ozone depletion due to human emitted ozone depleting substances cause UVB radiation exposure to human, animals and plants. In effect, the climate change and variability that we observe in the present times are mainly due to human activities including but limited to deforestation, industrialization and urbanization.