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Environmental Sustainability in Town and Country Planning

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ABSTRACT

The common goal of all the nations is to achieve sustainability by fulfilling the Sustainable Development Goals. Environmental sustainability is one of the major goals set by the United Nations Development Programme, and it is reflected in Goals 3, 6, 7, 12, 13, 14 and 15. However, with the advent of urbanisation, the human needs and the environment has always been in conflict. But it is much required that development does not supersede the environmental stability.Hence, it is an absolute necessity that urbanisation and development thereof prevail without causing harm to the environment. Therefore, all the facets of environment, i.e., air, water, forest, etc. need special attention and the planning authorities must include in their planning and decision-making processes the measures that would not only ensure sustainability and retain a healthy environment in the urban areas but also promote health, safety, morale and general welfare of the people living in these areas. The paper discusses the ways in which the planning authorities may adopt eco-friendly infrastructure in order to ensure environmental sustainability in the urban areas.

I. INTRODUCTION

The common goal of all the nations is to achieve sustainability by fulfilling the Sustainable Development Goals.[2] Environmental sustainability is one of the major goals set by the United Nations Development Programme, and it is reflected in Goals 3, 6, 7, 12, 13, 14 and 15.[3]

Environmental sustainability means the ability to conserve the elements of natural environment such as air, water, forest and wildlife for the future generations to come. According to the United Nations World Commission on Environment and Development, *"environmental sustainability is about acting in a way that ensures future generations have the natural resources available to live an equal, if not better, way of life as current generations".*[4] On the other hand, the U.S. Environmental Protection Agency defines it as *"meeting today's needs*

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[2] *Sustainable Development Goals*, UNITED NATIONS DEVELOPMENT PROGRAMME, https://www.undp.org/content/undp/en/home/sustainable-development-goals.html. (last accessed on Jan. 27, 2021)
[3] *Id.*
[4] *Id.*

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without compromising the ability of future generations to meet their needs."[5]

Environmental sustainability, therefore, focuses on the following aspects:-

1. **Shift to renewable resources –** Renewable resources are those resources available in nature that do not perish with time. In other words, renewable resources are inexhaustible and therefore, there can be no shortage in the availability of these resources. Also often termed as 'non-conventional' energy, it includes wind, sunlight, tidal waves, etc.

Renewable resources are considered anytime better than the resources found in the form of fossil fuels such as coal and oil. It is because of two reasons. First, fossil fuels are non-renewable and therefore, they will perish with time and usage; and second, renewable resources when converted into energy emits very limited pollutant and therefore, it does not contribute to greenhouse gas emission.

2. **Protect health of ecosystems –** One of the major aims of sustainability is to retain a healthy environment for the future generations. As such, protection of the ecosystems is very essential. A healthy ecosystem can provide for many benefits known as 'ecosystem services'. Ecosystems also contribute to achieving the Sustainable Development Goals, either directly such as Goal 15 that aims to promote life on land or indirectly such as livelihood.[6]

3. **Avoid excess pollution** – Pollution is a global phenomenon and the nations are trying all the possible means to escape from it or reduce its effects. Environment sustainability provides for sustainable measures that would ensure emission of zero or minimal pollutants into the atmosphere, thereby reducing the ill-effects of greenhouse gas emission.

4. **Intergenerational decisions –** As it has always been aimed for, environment and development must go correspondingly. Therefore, environment sustainability helps focus on economic decisions taken by authorities and ensure long-term plans and consequences.

II. ISSUE

Urbanisation puts a tremendous pressure on the environment. The effects can be categorised under the following heads:

1. **Depletion of the quality of air –** Urbanisation has a huge impact in the air quality, and significantly contributes to air pollution. The major sources of air pollution in urban areas are the greater number of cars that run on the streets and the lethal substances that are released by industries in gaseous form.[7]

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[5] *Sustainability*, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, https://www.epa.gov/sustainability (last accessed on Jan. 27, 2021)

[6] UNITED NATIONS DEVELOPMENT PROGRAMME, *supra*

[7] *Cars, Trucks, Buses and Air Pollution*, UNION OF CONCERNED SCIENTISTS, https://www.ucsusa.org/resource

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2. Water crisis – India is blessed with a sub-tropical climate. The country receives an annual rainfall of 119cm.[8] However, there is still a scarcity of consumable water in the country, especially in the urban areas. The non-availability of fresh water is due to the presence of contaminants in the existing water bodies. The contaminants change the composition of water and make it unfit for consumption. The rain water tends to flow down to these polluted water bodies and therefore, it too becomes unfit for consumption.

There are many reasons which are responsible for bringing such changes in the composition or quality of water. Some of these include the municipal sewage and industrial effluents. Generally, the urban areas in India lack proper sewage system and with the advent of urbanisation this problem has become more acute thereby making the sanitary condition very unhealthy and unhygienic.[9] Ultimately it leaves the people to suffer from various water borne diseases. Industrial effluents which contain both organic and inorganic hazardous materials are directly discharged into water courses. Some of these wastes are poisonous and thus, severely affect the purification mechanism which ultimately results in contamination of water courses and thus, become injurious to health.

3. Depletion of forest cover and natural water bodies - With the increasing population in the urban areas, lands for human settlement is constantly in need. As such, many forest cover and water bodies such as wetlands, or parts thereof are converted into human settlement facilities. Also, unplanned development of infrastructure such as roads, industries, conversion of wetlands into paddy fields and irrigation thereof also possess a serious threat on forests and water bodies.

III. RELEVANCE OF THE STUDY

Humans are considered central in the environment as any change in it, be it positive or negative is directly related to anthropogenic activities. Moreover, with the advent of urbanisation, the human needs and the environment has always been in conflict. However, it is much required that development does not supersede the environmental stability.

Hence, it is an absolute necessity that urbanisation and development thereof prevail without causing harm to the environment. Therefore, all the facets of environment, i.e., air, water, forest, etc. need special attention and the authorities must include in their planning and

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[8] *Rainfall Statistics of India – 2016*, INDIA METEOROLOGICAL DEPARTMENT (MINISTRY OF EARTH SCIENCES), http://hydro.imd.gov.in/hydrometweb/(S(0ymurl55bikbhgzupnyvnny0))/PRODUCTS/Publications/Rainfall%20Statistics%20of%20India%20-%202016/Rainfall%20Statistics%20of%20India%20-%202016.pdf (last accessed on Jan. 27, 2021)

[9] *The sanitation environment in urban slums: implications for child health*, 30(1-2) POPUL ENVIRON 26 (2008)

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decision-making processes the measures that would not only ensure sustainability and retain a healthy environment in the urban areas but also promote health, safety, morale and general welfare of the people living in these areas.

IV. ACHIEVING ENVIRONMENTAL SUSTAINABILITY THROUGH TOWN AND COUNTRY PLANNING

The task of town and country planning is decentralised, and it is the local bodies that undertake a major role in it. The urban local bodies have received constitutional status after the 74th amendment of the Indian Constitution in 1992. These bodies are institutions of self-government and they have the responsibility to look after the overall development of the area.[10]

One of the major functions of the urban local bodies is to promote infrastructure by introducing development plans.[11] Environmental sustainability can be effectively achieved by adopting plans for/and introducing green infrastructure.

The Town and Country Planning Association, UK defines Green Infrastructure as *"the subregional network of protected sites, nature reserves, green spaces, and greenway linkages."*[12]

According to Natural England, Green Infrastructure *is "a strategically planned and delivered network comprising the broadest range of high quality green spaces and other environmental features. It should be designed and managed as a multifunctional resource capable of delivering ecological services and quality of life benefits required by the communities it serves and needed to underpin sustainability."*[13]

Green infrastructure can be a solution to the environmental issues pertaining to urbanisation, and as such it can ensure environmental sustainability in the following ways:-

(A) To mitigate the problem of air pollution

1. Utilisation of renewable energy

Urban areas demand more energy in the form of electricity. Households, industries and even vehicles such as metro rails require electricity for its smooth functioning. Electricity, however, is generated mainly using coal. Coal is a non-renewable resource available on the earth's crust, and it will eventually get exhausted. It is estimated that coal along with other forms of fossil

[10] SUKANTA K. NANDA, ENVIRONMENTAL LAW (5th ed. 2019)
[11] *Id.*
[12] Town and Country Planning Association, *What is green infrastructure?* (https://www.tcpa.org.uk/green-infrastructure-definition (last accessed on Jan. 26, 2021)
[13] Natural England, *Green Infrastructure Guidance*

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fuels such as soil is likely to get exhausted in 40 years.[14] Moreover, burning coal for generation of electricity is one if the major contributors to air pollution.

Therefore, the urban local bodies may seek to be self-sufficient in terms of electricity by installation of solar panels in town spaces. Solar panels have the capacity ranging from 250 watts to 400 watts, depending on the requirement.[15] Solar panels are considered environment-friendly as it does not contribute to any form of pollution. They are convenient in usage as they can be installed on any surface area under the sun. For example, solar panels can be installed on rooftops, above bus stands or even on pavements, known as solar roadways.[16] Other forms of renewable energy such as wind energy and tidal energy can also be utilised for generating electricity, especially in those areas that adjoin the sea.

2. Walkways

The local bodies need to ensure that an efficient web of walkways exist throughout the development area so that there can be better connectivity. For this, the body must not just ensure concrete linear structures but also focus on recreational activities that might attract more and more people to opt for walking. Benches for leisure may be installed after every few metres for the pedestrians. The walkways may also be bordered with trees, thereby creating a tree canopy. Apart from the environmental benefits of having trees alongside the walkways, this will ensure that there is enough shade for the pedestrians.

With luring benefits such as these, more people are expected to take recourse to walking, and the number of vehicles on the streets will thereby reduce. This will in turn reduce the number of pollutants released in the air and therefore, the quality of air will significantly improve.

(B) To mitigate the problem of water crisis

1. Rainwater Harvesting

Rainwater harvesting is the process of collection and storage of rainwater for future use. It is collected on a surface and then redirected to a tank or reservoir.

Rainwater harvesting ensures self-sufficiency in terms of water, and can be done by all, i.e.,

[14] *Energy resources will be exhausted in 40 years: Expert*, The Economic Times, Mar. 27, 2017 https://energy.economictimes.indiatimes.com/news/coal/energy-resources-will-be-exhausted-in-40-years-expert/57846890 (last accessed on Jan. 27, 2021)

[15] *How much energy does a solar panel actually produce? Electricity output explained*, ENERGYSAGE https://news.energysage.com/what-is-the-power-output-of-a-solar-panel/ (last accessed on Jan. 27, 2021)

[16] *Solar roadways: The future of renewable energy?*, BIBLUS, https://biblus.accasoftware.com/en/solar-roadways-the-future-of-renewable-energy/#:~:text=Solar%20Roadways%20or%20photovoltaic%20roads,in%20electronics%20and%20electrical%20engineering.&text=LED%20lighting%20to%20create%20lines,accumulation%20of%20snow%20and%20ice (last accessed on Jan. 27, 2021)

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household, commercial complexes, industries, government authorities, etc. The process is very simple and not much cost is incurred in installing the equipment necessary for collection and storage of rainwater.

2. Permeable Roads

With concrete structures built on the earth's surface, there is hardly any scope for the stormwater to penetrate in the ground. On the other hand, with so many people living in urban areas, the groundwater level is deemed to deplete. As a result, this has resulted in water crisis in the urban areas.

In order to mitigate the issue, the urban local bodies may come with the construction of permeable roads. These roads do not let the water flow through but aims to retain the water where it falls and lets the ground absorb it. This not only ensures recharge of the groundwater level and improves the hydrological balance but also helps the stormwater from getting polluted. When stormwater flows through the roads and then through the rains, it carries particles of sewage or even pesticides and fertilisers in some cases that are enough to pollute the water body where the stormwater will ultimately get drained.[17]

(C) To mitigate the problem of encroachment of forest cover and water bodies

1. Green Roof

As urbanisation demands more landscapes for building infrastructure, green spaces are reduced. As a result, there are lesser number of plants to trap the carbon dioxide and other contributors of air pollution that are released from households, industries, vehicles, etc. Therefore, the urban local bodies may set up green space in roofs or terraces.

Green roofs have several benefits. First, it helps in curbing air pollution by trapping the hazardous gases; second, it helps in reviving the biodiversity by providing access to birds and insects like butterflies; and third, it helps in reducing the temperature of the buildings that trap the heat, thereby contributing to a reduction in the temperature.[18] Green roofs can also be utilised for vegetation and many vegetables such as capsicum, chilli and lemon can be grown in terraces. This ensures self-sufficiency and increases the well-being of people.[19]

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[17] *Sources and Solutions: Stormwater*, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, https://www.epa.gov/nutrientpollution/sources-and-solutions-stormwater (last accessed on Jan. 27, 2021)

[18] *Benefits of a green roof*, SEMPERGREEN, https://www.sempergreen.com/en/solutions/green-roofs/green-roof-benefits (last accessed on Jan. 27, 2021)

[19] *Rooftop Farming: How urbanites are making a healthy transition towards homegrown food*, Business Today, Jun. 27, 2019, https://www.businesstoday.in/opinion/columns/rooftop-farming-urbanisation-urbanites-healthy-transition-towards-homegrown-food-climate-change-green-farming-organic-friendly/story/359346.html (last accessed on Jan. 27, 2021)

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2. Riparian Buffer

Riparian buffers are similar to the eco-sensitive zones that surround the protected areas. As the name suggests, they act like buffers and absorbs the harmful substances that approach the water bodies. The buffers are constructed around the water bodies by growing natural vegetation.

Riparian buffers have several benefits. First, as it surrounds the water bodies, it becomes difficult to encroach these water courses for commercial or residential or other purposes. Second, it helps in improving the quality of the water by absorbing the run-off water and filtering pollutants, residue or sediments therefrom. Third, it regulates the in-flow of the water bodies by absorbing the run-off water, thereby recharging the groundwater level. Heavy in-flow of water into the water bodies may result in over-flow and may even result in flooding. Fourth, the vegetation provides organic matter to the terrestrial as well as aquatic animals, and ensures a healthy ecosystem.[20]

V. CONCLUSION

Climate change is the most severe problem the world is facing in the present times. As it a global phenomenon, all the nations must come together towards reducing the emission of greenhouse gases and protecting the natural resources of the earth. The efforts need to be made from the ground level and as such, the landscape planning organisations worldwide have a very important role to play in this regard.

Development is inevitable and its prevention is not even advisable. However, in the course of development, the environment is not to be compromised. Environment is what we live in and what we are part of. Therefore, it is very essential that environmental sustainability is maintained amidst development.

It must always be kept in mind that environment should supersede development, and not the other way around.

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[20] *Green Infrastructure Fact Sheet - Riparian Buffers*, DELAWARE.GOV, https://dnrec.delaware.gov/GI/Documents/Green%20Infrastructure/Riparian%20FS_04-1.pdf (last accessed on Jan. 27, 2021)

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4. *Global Future Council on Infrastructure Six Qualities of Sustainable Infrastructure*, WORLD ECONOMIC FORUM (2020)
5. I.C. Mell, *Green infrastructure: Concepts and planning*, FORUM E-JOURNAL (2008)
6. Mark A. Benedict & Edward T. McMahon, *Green Infrastructure: Smart Conservation for the 21st Century* (2006).

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