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Opinion Letter

Urban Forests and Green Infrastructure Improve Ecology in Cities

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The need for urban greening is increasing by times with accelerated rates of global urbanization. Trees and other green infrastructure are the major assets to livable urban areas, providing valuable environmental services to combat challenges like air and water pollution, urban heat and flooding, as well as to improve social cohesion, human health and well-being. Investments in tree planting and arboriculture yield valuable returns ecologically, economically and by human health and well-being, But trees face many challenges in the unnatural and stressful urban environment and in rapidly changing climate.

World population growth in future and migration streams will redistribute the Earth population in a way that will affect the natural systems of the earth and the interactions between urban environments and populations. Urban people alter their environment through their consumption of food, energy, water and land. In turn polluted urban environment affects the health and quality of life on the urban population. Urgent actions are needed to work out effective solutions for sustainability and well-being of people and the environment in urban areas. Urban greening with a focus on improving the longevity and health of trees in urban forests can enhance ecosystem services and living conditions of metropolitan areas.

In the 20th century the world population increased more than 400 percent. In 2018 more than 50 % of the world's population lived in urban areas and this amount is predicted to increase to 68% by 2050. Such rapid urbanization is accompanied by environment degradation like air pollution, heat island effects, soil erosion, habitat and wildlife loss, carbon emissions, noise increased levels, etc. impacting human health, life quality and well-being. These effects are exacerbated by global climate change, requiring urgent response. Sustainable development measures are needed which will include additional tree cover in cities to help ameliorate environmental, economic and social conditions for urban people and communities.

The urban forests include the sum of all trees growing in highly altered community environments where humans are the main drivers of influence and disturbance. The urban forests encompass trees on public and private property, including individual trees along streets and in backyards, as well as stands of remnant forests. Furthermore, urban forestry is science of managing trees, forests and ecosystems in and around cities, suburbs and towns for health and well-being of all people. The urban forests are part of a larger network of green infrastructure. They can help to create more livable cities by providing ecosystem services and benefits.

Besides all positive ecosystem services and benefits urban forests can have some dis-benefits too which should be considered during policymaking, planning, management and consultation with stakeholders. In different contexts trees may provide dis-benefits to urban dwellers. For example, urban trees may fall and injure people or damage some property. They may also damage side-walkers or other infrastructure which can also cause injury, or conflict with overhead or underground utilities or solar panels. Careful site selection and proper maintenance may reduce these risks.

Many urban forests are planted with trees that produce allergenic pollen, which causes discomfort and lowers quality of life for urban residents. Trees that produce large amounts of pollen can be avoided during tree planting. Urban areas are especially susceptible to invasion by exotic species. These species may put enormous pressure on urban forests and eventually replace the native species composition.

Urban forests are critical components of green infrastruc-

ture of the cities and are important in providing ecosystem services to global population. Urban trees reduce air pollution, removing harmful particular matter and offsetting carbon emissions through carbon storage. They mitigate water pollution by reducing storm water runoff. Urban trees lower energy costs of buildings through shading and evaporative cooling, reducing building energy consumption up to about 40 percent. Urban forests and other green infrastructure provide a lot of health benefits to people by providing them with cleaner atmospheric air. People living in greener parts of the cities are less susceptible of air pollution than those living in the central, overcrowded and polluted parts.

Big mature trees with large crowns provide more carbon storage and different ecosystem services than smaller ones. Besides, they are giving more shade and more habitat and food for animals. At the same time they have symbolic, religious and historic value and meaning. They represent iconic landscape elements in urban parks and centerpieces along streets and in neighborhoods. However, large trees face the most threats and are globally declined.

In future priority should be given to protect big, mature trees in parcs since they provide immediate benefits. Regulations are needed on local, regional and national levels to promote protection of existing trees especially those that are large and historic value. The environmental, esthetic and cultural loss is tremendous each time when a mature tree is removed. Procedures and guidelines on planting, tree care, protection, tree removal, replacement and invasive species control are of essential value

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