Environmental Etiquettes for Sustainable Urban Development in India

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Abstract
In the midst of increasing pressure of climate change and related effects on the urban ecosystem and human well-being, many countries have started following certain rules-regulations to control environmental degradation. India is also not an exception to that. But to transform the nature of looking at the urban development in India, there must be certain fundamental etiquettes and attitudes for environmental protection and preservation. We must nurture the value of protecting it our present generation for the benefit of future generation. This paper talks about the rapid urbanization and environmental challenges for cities in India. It discusses the important case studies of sustainable urban development around the world to fill the gap in the present effort to utilize our natural resources more effectively and efficiently. Moreover, this paper takes on the issues of environmental safeguard and focusses on the role of urban local bodies, NGOs and urban citizens who are the key stakeholders in saving and conserving urban ecosystem. Lastly, the paper comes up with an environmental etiquettes framework and some applicable suggestions for achieving sustainable urban development in India.

Key words: *Climate Change, Environmental Etiquettes, Sustainable Urban Development, Environmental responsibility*

I.   Introduction

Urban areas are considered to be the hubs of opportunity, cross-cultural interactions and cohesion. They concentrate the majority of the world's population and deliver services to large numbers of people, creating jobs and driving innovation and economic growth. Between now and 2030, 1.5 million people are expected to arrive in urban areas every week, and 75% of the population on Earth will be living in cities by 2050, compared with 56% today *(World Economic Forum, 2021).* An "urban era" is taking place. Cities account for 80% of global GDP and will host 75% of the world's population by 2050. Urban leaders and decision-makers have a leading role to play in shaping a sustainable, resilient and prosperous future for all *(World Economic Forum, 2022).*

The world is entering into the greatest period of urbanization in human history with rapidly changing climate. The rapid urbanization process, which keeps adding pressure to cities' service provision and infrastructure development, along with rising temperatures and increasingly severe natural disasters, has caused profound damage to the environment in cities. Urban economies and livelihoods are increasingly under pressure from climate impacts and nature loss. The international climate science research community has concluded that human activities are changing the Earth's climate in ways that increase risk to cities. This conclusion is based on many different types of evidence, including the Earth's climate history, observations of changes in the recent historical climate record, emerging new patterns of climate extremes, and global climate models. *(World Economic Forum, 2022).*

During the last two years, number of global events have greatly increased the risk for urban lives. There arises a need to transform the built environment for a future where buildings and cities will have to be more liveable, sustainable, resilient, and affordable. Cities and their citizens already have begun to experience the effects of climate change. To prepare cities for a more sustainable future and to make cities more resilient to climate-related disasters, the global city leaders including the government, the private sector, non-governmental organizations and the community will have to assess the current and future risks regarding increasing pollution and to make choices that enhance resilience to climate change and environmental extremes. The time has ripened to take nature into consideration as a key stakeholder in urban political and economic decision-making

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for the benefit of human livelihoods and planetary wellbeing. Most of the projections for future climate change are most often defined globally, it is becoming increasingly important to assess how the changing climate will impact cities.

II.   Objectives& Research Methodology

This paper has the major objective of suggesting certain efficacious and expedient environmental etiquettes for sustainable urban development in India. Following are some of the objectives.

1.   To look at the present situation of rapid urbanization and challenges for cities in India.
2.   To highlight the requirement for sustainable urban development in India by looking at some of the important case studies around the world.
3.   To understand the role of an individual, community, society, urban local government, local administration, corporates, media and NGOs in sustainable urban development.
4.   To layout an environmental etiquettes framework for achieving sustainable urban development in India.

This paper is based on secondary information collected from various national and international reports, journals, government publications etc. The analysis is descriptive in nature.

III.   Rapid Urbanization and Environmental Challenges for Cities in India

Cities contribute to and are affected by climate change. There has been an increasing challenge of environmental changes for urban development in the last two decades. According to UNDP, cities occupy just 3 % of the earth's land but they consume 60 to 80 % of energy and emit at least 70 % of carbon dioxides in the atmosphere. It further says that by 2050, the urban population is expected to reach 6.5 billion i.e. two-thirds of the world population from today.

According to World Economic Outlook, July 2021, the total population of India (up to 2018) is 1354.05 million and out of this 460.78 million is urban population which almost 34.03 % of the total population in India. This data shows that the process of urbanization and the overall transition from rural to urban has been fast paced.

Urbanization is generally associated with anoverconsumption and degradation of environmental resources within and beyond a city's limits*(Seto, K.C., et al, 2013).*Many cities in the world are experiencing growth in urban population. The globalization and migration of population from the rural to urban areas has hastened the process of urbanization in many developing countries. In India, the metropolitan cities like Delhi, Mumbai, Bangalore, Ahmedabad, Hyderabad, Surat, Jaipur, Bhopal, Chennai, Kolkata are experiencing pressure of urban population growth.

In developing countries like India, cities are attractive places to live. The major attractions are business and jobs opportunities, educational and health facilities, entertainment, transport, communication, markets etc. However, these cities are having lots of problems in the form of environmental pollution, traffic congestion, high concentration of solid waste, high cost of living, unemployment, poor habitations, lack of skilled labour, inadequate health facilities, water shortages etc. As the process of urbanization magnifies, more and more people move to cities and these negative effects start intensifying. Moreover, rapid urbanization in India has led to sharp increase in poverty, landlessness and they have been suffering by poor living conditions.

According to the 2003-2012 Global Footprint Network, current global consumption pattern demands 1.5 planets to provide the resources and absorb the waste. If this will continue, by 2030, two Earths will be required to support human race.

During the last two decades, there has been a serious crisis in India's solid waste management. Due to poor practices in waste collection and management with limited resources, environmental degradation has been skyrocketing. It is an incommodious fact that India is one of the largest generators of solid municipal waste in the world. It is even painful to accept that the bigger part of this waste is disposed of without any sort of treatment or processing which leads to fatal health issues in the nearby locality. If we talk about electronic waste, it has been growing 220% from 2017-18 to 2019-20. On the other hand, plastic waste generation has been also growing faster and less than half of India's plastic waste is recycled. India is having 34.7 lakh tonnes of total plastic waste per annum. Besides this, the stubble burning in north India is perhaps the most glaring example of poor waste management which results into loses of crores of rupees every year. Only in Punjab, 20 million tonnes of rice stubble produced and 80% of rice stubble burnt every year in Punjab. If we look at per capita food wastage, according to the World Food Waste Index Report, 2021, per capita food wastage in India annually is around 50 kg which means total amount of food loss on yearly basis is 68.7 million tonnes. According to World Resources Institute India Report, estimated value of post-harvest losses in India in 2014 was Rs. 92,000 crores.

The Waste-wise Cities: Best practices in municipal solid waste management report of Niti Aayog, 2021 shows that top 15 states of India produce more than 95% of daily waste. It is shown in the following figure-1.

Figure-1
Daily Waste (Tonnes/Day)
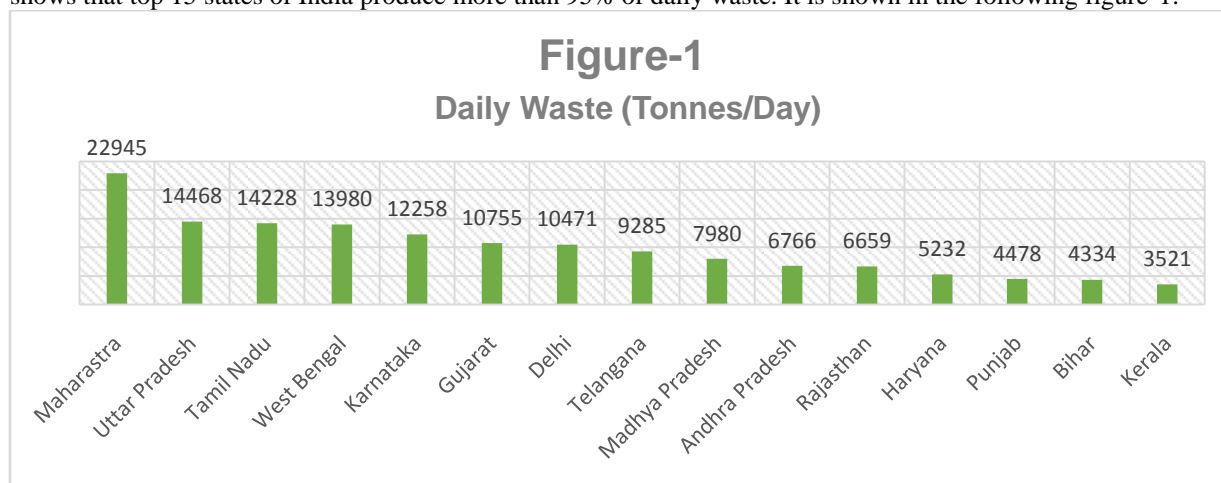
Source: Waste-wise Cities, Report of Niti Aayog, 2021

It is estimated by the United Nations that India is witnessing an 'urban explosion' and the total urban population is likely to reach 575 million (40.90%) by 2030. Indian urbanization is intricate, complex and diverse. Poverty induced migration occurs due to rural push. Statutory Towns have grown without Master Plans. There has been lot of issues with urban land like sub-optimal utilization, fragmented and poorly recorded ownership, and complex process of acquisition.Megacities such as Delhi, Mumbai, Kolkata, Chennai, Hyderabad and Bangalore have grown in urban population not in urban prosperity. They have been facing many issues like lack of availability of serviced land, traffic congestion, pressure on basic infrastructure, extreme air pollution, urban flooding, water scarcity and droughts etc. which are a reflection of infrastructural shortcomings in these big cities. These issues indicate a deep and substantial lack of adequate urban planning and governance frameworks. More than 65% of the 7933 urban settlements do not have any master plan which is the statutory instrument to guide and regulate the development of cities. This has led to piecemeal interventions, haphazard constructions, urban sprawl and environmental pollution. States like Goa, Gujarat, Kerala, Tamil Nadu and Maharashtra have attained more than 40 percent growth in urbanization during last one decade. While states such as Bihar, Odisha, Assam and Uttar Pradesh are having 31.1 percent growth rate in urbanization. Over 75 percent of the urban population is in 10 states including Maharashtra, Uttar Pradesh, Tamil Nadu, West Bengal, Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Rajasthan and Kerala. *(Niti Aayog, 2021).*

If we look at the urban water supply scenario in India, it has been found by the World Wide Fund for Nature India (2020) that Indian cities are having the highest overall water risk in both current and future lists of cities across the world. Besides this, many Indian states have limited groundwater resources and low quality of surface water.

Highly urbanized coasts most at risk include Gujarat and Maharashtra in western India, Tamil Nadu and Kerala in Southern India and West Bengal and Orissa in eastern India. A sea-surface temperature rises of 2–4° C, as expected in the Indian Ocean over the century, is expected to induce a 10–20 per cent increase in cyclone intensity *(Aggarwal and Lal, 2001).* Since cyclone-formation frequency in the Bay of Bengal is about five times that of the Arabian Sea *(India Metrological Department, 1966, 1979, TARU 2005)* India's east coast is clearly at more risk. The high concentration of population, especially on the eastern coasts of India and Bangladesh, has led to extremely high vulnerability in this region, leading to very large loss of life and property *(Revi, 2008).*

Requirement of Sustainable Urban Development

A sustainable urban development is one that meets the needsof its dwellers without putting unsustainablepressure on the natural resources on whichit depends, both locally and globally *(World Economic and Social Survey, 2013).*The report of the World Commission on Environment and Development (WCED) put emphasis on sustainable development assuming a broader significance as a process of change. This process includes use of resources, the direction of investments, the orientation of technological development and institutional changes must all contribute to enhancing the quality of human life, today as well as tomorrow, within the carrying capacity of supporting economic systems. It broadly emphasises on the establishment of a condition of ecological and economic stability that is sustainable far into the future. The United Nations

Environment Programme and its partners have been persuading the nations of the short and long-term benefits to be gained from the sound environmental management of natural resources.

Sustainable urban development is the way forward for cities to mitigate climate change. If urban different urban places will have integrated design, with close connection between them and near-excellent transit service to the rest of the city, the opportunities will increase and people will have more resources at the lowest financial and environmental cost. Inclusive development is an essential foundation for long-term sustainability, equity, shared prosperity, and civil society in cities. *(ITDP, 2021).*

Sustainability is no longer a "luxury good" but a "basic need" of cities if they want to survive and flourish in the future. Cities will have to learn to be sustainable in terms of their needs, energy, food, water and other resources. Cities need to be committed and choose what they want to achieve and prioritize their needs. Cities must control their ecological, water and carbon footprints, especially when climate change. Cities must move away from reliance on fossil fuels to power themselves, but develop clean and more sustainable alternatives*(Chan, 2017).*

Sustainable urban development is important because urban areas now a day contribute significantly to the Gross Domestic Product. They contribute increasingly to export and is a rich place for capital formation. The United Nations Conference on Human Settlements (1996) has delineated certain pre-requisites for Sustainable Urban Development. They are to assure minimum level of living for inhabitants, to shift the attitude of the people in the direction towards enterprise and equity, to become self-reliant and sustain without much depending on external sources, to continue the process of renewal of developmental institutions to maintain their relevance to the needs of urban areas, to encourage participation of private sector, NGOs and community organizations to maintain level of development, to manage urban growth to promote minimal use of environmental capital vis-à-vis meeting social and economic goals.

In September 2015, the United Nations endorsed the new Sustainable Development Goal 11, which is to "Make cities and human settlements inclusive, safe, resilient and sustainable." This new sustainability goal cannot be met without explicitly recognizing climate change as a key component. Making cities sustainable means creating career and business opportunities, safe and affordable housing, and building resilient societies and economies. It involves investment in public transport, creating green public spaces, and improving urban planning and management in participatory and inclusive ways.*(https://www.in.undp.org/content/india/en/home/sustainable-development-goals/goal-11-sustainable-cities-and-communities.html).* So, besides Goal 11, other important SDGs mentioned in the table-1 below are equally important for Sustainable Urban Development which are complementary to Goal No.11.

Table-1 Sustainable Development Goals which are directly related to Sustainable Urban Development:

Goal No.	Focus on
6	Ensure availability and sustainable management of water and sanitation for all
7	Ensure access to affordable, reliable, sustainable and modern energy for all
9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
11	**Make cities and human settlements inclusive, safe, resilient and sustainable**
12	Ensure sustainable consumption and production patterns
13	Take urgent action to combat climate change and its impacts

Source: https://sdgs.un.org/goals

To enhance quality of life and social equity, sustainable city development is required. To mitigate the causes of climate change and accommodate with new climate conditions, intensive and extensive transformation will be required in urban energy, transportation, water use, land use, ecosystems, growth patterns, consumption, and lifestyles. For more cooperative and integrated urban development, it is necessary to design easy walking and cycling connections to bring people, activities, buildings, and public spaces together. To have an inclusive access to all urban opportunities and conveniences, urban-rural, peri-urban and metropolitan regional linkages are really significant. For that an equitable and holistic approach is required. Cities can help control climate change via reducing greenhouse gases, renewable energy, green designs, sustainable communities, eco-cities and other city measures.

IV.   Some Exemplary Case Studies of Sustainable Urban Development around the World

The Second Assessment Report of the Urban Climate Change Research Network (*Rosenzweig, et.al.,2018)*talked about five pathways to mitigate climate change in cities of the world. The first Pathway talks about integrating mitigation and adaptation measures, the second pathway deals with coordination of disaster risk reduction and climate change adaptation, the third pathway is about co-generation of risk information, the

fourth pathway addresses to focus on disadvantaged populations and the fifth pathway is related to advance governance, finance and knowledge networks.

Green buildings are one of the best ways today to reduce the urban heat. To address sustainability and act on the urgency of climate change, the Green Building Principles have been developed by the think tank of World Economic Forum to simplify the process of delivering net-zero carbon portfolios and accelerate action from their peers across every industry (*World Economic Forum, 2021*). It is necessary for cities to make construction of new buildings according to green building model *(Chan, 2017)*.

Recently in the New York Times article on City Forest Credits - An investment model to support increased urban tree cover discusses about The non-profitcarbon registry, City Forest Credits which hasdeveloped Carbon+ Credits for city forests in US by workingwith scientists, urban forest professionals and carbonindustry experts to develop credit issuing standards.The standards include rules for eligibility, ownership,quantification, monitoring, verification and issuance ofCarbon+ Credits that quantify not just CO2, but storm-waterreductions, air quality impacts and energy savings. It is clearly visible that increasing tree cover in cities not only has a quantified positive environmental impact, but it also brings social and economicbenefits through youth engagement, new workforces andnature enhancement in under-resourced neighbourhoods.

In addition, it provides a way for the private sector tocontribute to green, healthy and more equitable cities. *(McPherson&Wildish, 2021)*. Increasing tree cover in cities has been proven toprovide significant economic, health and climatebenefits*(The Nature Conservancy, 2017, and Ulmer et al., 2016)*.

In one of the studies on 'Analysis of the economic factors affecting household consumption expenditures in Azerbaijan', the researcher has concluded that responsible consumption behaviors in society should be encouraged and supported. This can lead to effective environmental management. *(Zeynalova & Mammadli, 2020)*.

In two similar kind of studies it is found that relatively younger, better educated, women and who have higher incomes are more environmentally sensitive consumers and they are more ecologically conscious. One is on Explaining the Subtle Relationship between Environmental Concern and Ecologically Conscious Consumer Behaviour *(Roberts & Bacon, 1997)* and another is on Environmental Segmentation Alternatives: A Look at Green Consumer Behaviour in the New Millennium *(Straughan & Robert, 1999)*.

A case study on sustainable development of urban communities in Taipei shows that effective community governance can provide benefits to community members. The authors has given a framework for urban community governance which says that State and market act as two exogenous variables of the community institutions and public participation and cooperation among the members themselves is significant in promoting sustainable development at local level. So that it can reduce institutional costs and promote the efficiency of the system *(Yang & Weihong, 2019)*.

The study on 'Revealing consumer behavior toward green consumption' discusses about the relationship between the attitudes and behaviors of administrative staff of four Baku universities toward the consumption of environmentally friendly products. The products taken in the survey which have certain characteristics like products that do not use any chemicals, healthy products, energy-saving products, produced from renewable resources, products not tested on animals, specially labeled products, products that are not harmful to living beings, products that protect natural resources, reliable products, products that generate less waste, recyclable or reusable products etc. and they tried to measure the percentage of people consuming green products of these types. In this way, they tried to measure the impact of consumer behavior towards green consumption. The results of the study shows thatthe behavior depends on the age, the number of household members, marital status, education level and income. Atthe same time, the main indicators that consumers paid attention to were price, brand, appearance,advertising, expert opinion and label information. *(Zeynalova & Namazova, 2022)*.

V. Role of Urban Local Bodies, Society, Citizens, NGOs, Media and Corporates for Sustainable Urban Development

The role of urban local bodies, citizens, societies, NGOs, media and corporates has become vital for sustaining bio-diversity in urban landscape. Municipal Governments have the main responsibilities for planning, implementing and managing most of the measures that can diminish risks to highly vulnerable sections of the population from the direct and indirect impacts of climate change – through provision of infrastructure and services, disaster preparedness and the planning and regulatory framework *(Satterthwaite, 2008)*. With more than half of the human populationresiding in cities, environmental conservation can only be successful and climate change effects can only be reduced if city administration, some non-governmental organizations and community participation take the lead. Besides this, there must be participatory and intergenerational approach in urban design and planning and urban leaders from the public and private sectors must come forward to

conserve, connect, restore and enhance natural urban ecosystems by defining actions for nature-spatial integration, urban governance and resource mobilization.

There is a need to incorporate environmental etiquettes into the lives of the people, society as well as those who are directly or indirectly linked with the process of environmental conservation in urban areas. Different entities like individual, community, society, government, corporate houses, institutions (public and private), media, NGOs etc. have particular responsibilities to undertake for sustainable future in urban localities. Following table-2 shows how these different entities can contribute towards sustainable urban living by identifying certain responsibilities and environmental safeguards.

Table-2 Responsibilities and Environmental Safeguards to be followed by Different Entities

Sr. No.	Entity	Responsibilities and Environmental Safeguards
1	Individual	- To follow 3R rule of reduce, reuse and recycle for sustainable living. - To buy local and organic products to reduce carbon footprint. - To appreciate the beauty of nature and live in harmony with it.
2	Community	- To demonstrate the importance of sustainable living by community gatherings. - To indulge in responsible community celebrations.
3	Society	- To make environmental conservation a motto for a society. - To encourage people to go green and grow food where it is possible in their backyard
4	Government (Urban Local Body)	- To strictly monitor solid waste management mechanism. - To use display and sign boards for easy understanding of environmental etiquettes to be followed by citizens
5	Corporate	- To adopt eco-friendly technology in production, selling and marketing.
6	Educational Institutions	- To organize environmental awareness rally, campaign and exhibitions. - To organize student seminars, workshops and conferences on environmental management and nurture environment friendly behavior and attitude.
7	NGOs	- To support society and government in making sustainable development in real sense.
8	Media (Print, Digital, Social)	- To make positive changes in the society through showing negative impact of pollution.

Besides, for effective governance, the national as well as state governments must set up a support system for better performance of local government. The good quality of government leads to provision of quality infrastructure, disaster-preparedness plan and proper coordination for rescue and reconstruction activities. It is necessary that local government creates an enabling environment for local civil society to contribute and to improve resilience. For sustainable urban development, the municipal corporations should give investment opportunities to new start-ups to invest in sustainable transport infrastructure, waste management solutions, water supply, parking lots, wastewater treatment solutions, residential sharing, urban green roofs, flexible offices, coastal wetlands restoration, sustainable asset valuation etc.

Today, at various global summits on environmental issues, urban leaders have been coming to join the forces with multiple groups including city networks and climate scientists for managing long-term climate risks in ways that protect people and encourage prosperity. These scientists assess the conditions within their cities in order to take science-based actions that increase resilience and reduce greenhouse gas emissions, thus limiting the rate of climate change and the copiousness of its impacts. Therefore, climate change mitigation and adaptation should be seamlessly integrated in local urban development plans which have long-term consequences on a city's contribution to GHG emissions as well as response to climate vulnerabilities and hazards *(Chowdhury, Mukhopadhyay, & Gaur, 2021)*.

Environmental Etiquettes for Sustainable Urban Development in India

According to Niti Aayog Report on Reforms in Urban Planning Capacity in India, 2021, India is the second largest urban system in the world with almost 11% of the total global urban population living in Indian cities. As cities are continuing to expand, it is imperative that urban management and planning must become insightful and incisive. They must be more sustainable and environment friendly which do not stop the process of socio-economic development.It is envisaged by many international organizations concerned with climate change and environmental issues that to fulfil the targets for SDGs, the global to local governance system must be improved.

The following Chart-1 shows environmental etiquettes framework which tries to exhibit the relationship between two types of stakeholders including policymakers (local government, city administration and public financial institutions) and respondents (civil society, NGOs/private sector/academic & research institutes and private financial institutions). If they work together in collaboration by following certain environmental etiquettes as mentioned in the framework, it can lead to achieve various sustainable development

goals linked with urban environment. These can be flexible and coordinated Urban Governance, investment mobilization which reflect the true value of nature, deep integration of natural ecosystem in local planning, more space for smart infrastructure, more use of public transport, energy efficient measures for lighting, creating an inclusive market for Carbon Credit, conservation of existing natural habitats, solar power installation for every new buildings and existing government buildings, sustainable housing practices, capacity building for efficient utilization of environmental resources, proper monitoring and evaluation of policies and plans, sharing of knowledge, information and ideas about environmental conservation, technical consultancy services, parking strategies and develop tree plantation as a habit

Chart- 1 Environmental Etiquettes Framework for Sustainable Urban Development
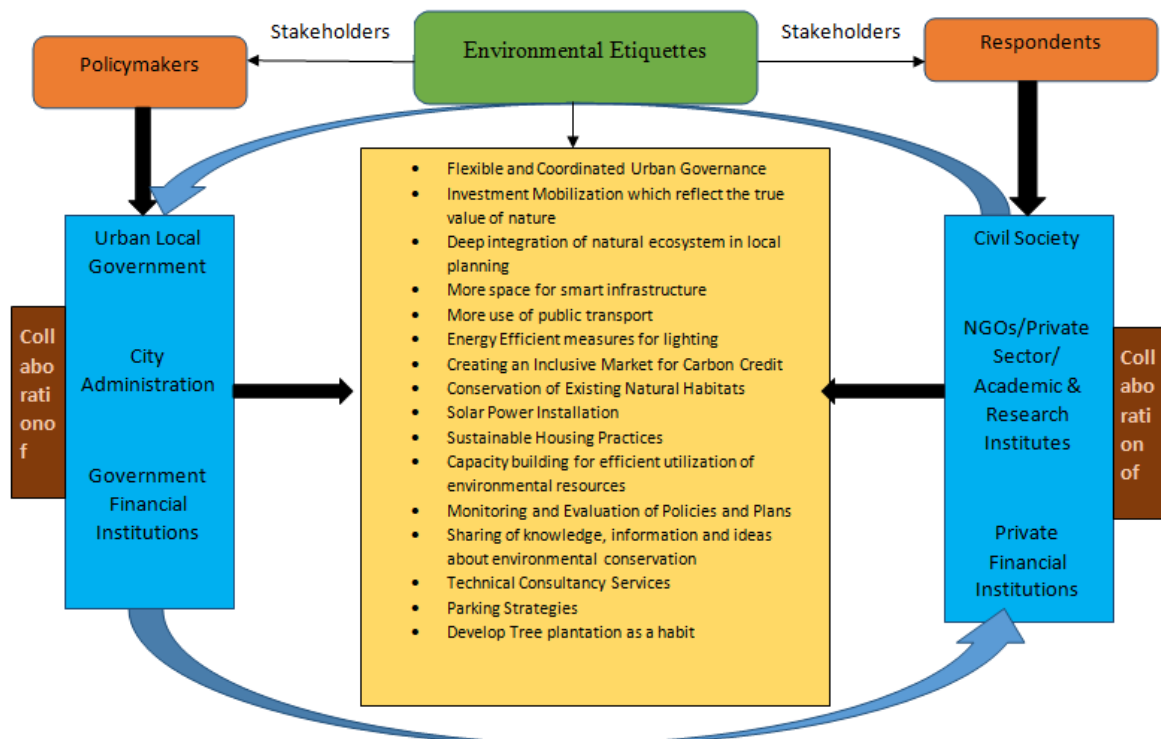
Moreover, other major collaborative tasks which can be followed are mainstreaming of environmental pollution data, huge investment in research and development, policy of innovation, strong commitment for environmental preservation, reuse of suboptimal land, recycling of waste water, protection, regeneration and redevelopment of degraded land, cross-sectoral and multi-sectoral coordination. Besides, town planning committee should include multi-disciplinary team members, apparent risk structuring, collaborative, constructive and cooperative efforts for urban planning, adequate time frame, effective utilization of financial resources, architectural and management consultancies, promotion of eco-friendly start-ups, economic, scientific and artistic development of settlements and speedy grievance redressal to stop environmental degradation.

VI. Conclusion

Thus, it is now pertinent for every Indian Urban Government, NGOs, civil society, corporates, public and private financial institutions and academic & research institutions to conserve and nurture environmental values and ecosystem dynamism. It is high time due to increasing risk of climate change that the urban citizens, local leadership both political and administrative, private institutions as well as academic and research institutions will have to follow certain self-rules which will save the environmental resources for the benefit of the future generations. For this they will have to go for energy optimization for new construction, to recognize biodiversity as the foundation of urban sustainability, climate resilience and human wellbeing. They will have to continue urban transformation and innovation efforts by developing new technology, untapped potential of nature, multidisciplinary expertise, nature-positive entrepreneurial approaches, changing the behaviour towards improving environment conservation and sustainable waste management. The government needs to encourage city officials, the private sector and the whole urban community to harvest and spread the evidence on the real opportunities for cities to reverse their impact on nature. It is necessarily inevitable now to prioritize bio-circular urban economy and bio-inspired innovations for economic competitiveness.

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