

## **BASICS OF URBAN SUSTAINABILITY**

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### **ABSTRACT**

*Urban sustainability is the idea that a city can be organized without excessive reliance on the surrounding countryside and be able to power itself with renewable sources of energy. The aim of sustainability is to create the smallest possible ecological footprint and to produce the lowest quantity of pollution possible, to efficiently use land, compost used materials, recycle it or to convert waste-to-energy, and to make the city's overall contribution to climate change minimal. This paper attempts to analyze and evaluate various definitions and concepts of urban suitability and point out various sustainability indices to achieve such development. In India, the cities are expanding and new cities are being formed mainly by transformation and growth of villages and towns due to rapid urbanization. But these cities lack basic infrastructural services and other amenities due to various reasons ranging from lack in administrative and service delivery mechanism to lack of proper planning vision, investment, management, and to some extent changing lifestyle, etc. Therefore, the paper depicts the role which urban planners can adopt in present situation to create sustainable cities. The various parameters to calculate urban sustainability index including energy, food, waste, water, pollution, infrastructure, etc. help us determine the quantitative aspect of sustainability.*

**Keywords:** *Indices, Parameters, Role of Planners, Urban Planning, Urban Sustainability*

### **I. INTRODUCTION**

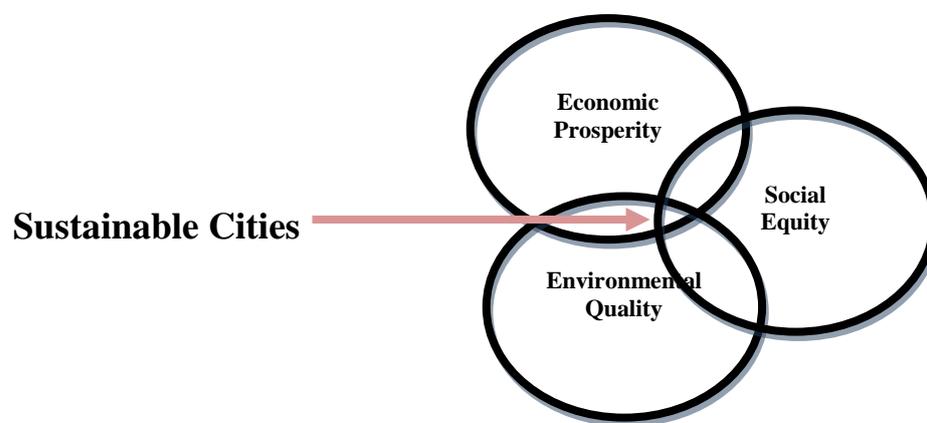
The inter-relationship between citizens, economy and environment of any city forms the base for its sustainable development. In Indian context it is very important to maintain social balance through diverse involvement of citizens in decision making in order to create a collective vision for the sustainable future. The approach to sustainable development can vary from one region to another. There are many different definitions and many different ways for communities to achieve sustainable growth. Few of the definitions are listed below:-

- The most common and widely used definition of sustainable development comes from the United Nations Brundtland Commission: "Development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs."  
-World Commission on Environment and Development (WCED) 1987.
- "A sustainable community is one in which improvement in the quality of human life is achieved in harmony with improving and maintaining the health of ecological systems; and where a healthy economy's industrial base supports the quality of both human and ecological systems."  
- Indigo Development
- "A sustainable community uses its resources to meet current needs while ensuring that adequate resources are available for future generations. It seeks improved public health and a better quality of life for all its

residents by limiting waste, preventing pollution, maximizing conservation and promoting efficiency, and developing local resources to revitalize the local economy." - Concern, Inc. (1993)

From all the definitions we can gather that urban sustainability is based on positive interactions among three different urban sub-systems:- *Social, Economic* and *Physical*, where social well-being coexists with economic development and environmental quality. Technology plays a vital role in creating the goal of sustainability. Arguably it is the misuse of technology that works against this goal.

For an urban area to be sustainable there should be development which is sustainable in these three fields, also known as the three pillars of sustainability which are: environment, economy and society [*Quality of Life, Sustainable Civil Infrastructure, and Sustainable Development: Strategically Expanding Choice, ASCE, March 2011*].



**Fig 1: The Three Pillars of Urban Sustainability**

**Environmentally**, sustainable development requires that natural assets are preserved and are not consumed more quickly than they are replenished (through natural or technological means).

**Economically**, sustainable development requires the maintenance of healthy markets through which financial means are leveraged to produce and maintain capital assets.

**Socially**, sustainable development involves the development and maintenance of quality of life (QOL) for human beings and communities.

This paper aims at analyzing various indices of sustainable development so as to attain directional and balanced growth of any city and also to identify the problems in achieving such development. It also discusses the role and contribution of planners in achieving overall sustainable growth of a city.

## II. DEFINITIONS

One of the definitions of urban sustainability have been given by Rees, as “development which ensures that the utilization of resources and the environment today does not damage prospects for their use by future generations” [CCREM, 1987]. This definition emphasizes on the environmental sustainability and talks about the usage of resources and its effect on environments for today and future both.

Pearce, D. (1988) says, "In simple terms [sustainable development] argues for (a) development subject to a set of constraints which set resource harvest rates at levels no higher than managed or natural regeneration rates; and (b) use of the environment as a ‘waste sink’ on the basis that waste disposal rates should not exceed rates

of (natural or managed) assimilation by the counterpart ecosystem." [*Economics, Growth, and Sustainable Environments*]. This definition suggests that an urban area is said to be sustainable only when the waste disposal mechanism is faster than the waste generation. Also, the resource regeneration is faster than consumption.

Allaby, M. (1988) suggests "Sustainable development is economic development that can continue indefinitely because it is based on the exploitation of renewable resources and causes insufficient environmental damage for this to pose an eventual limit." According to Allaby, economic aspect of sustainability is un-ending and all other environmental and ecological aspects come hand in hand with it, only then its complete sustainability.

There are various definitions of urban sustainability in context with utilization of renewable resources, protecting the ecosystems and safeguarding the environment. Another definition of the urban sustainability is given by Braat, L.C., and Steetskamp, I. (1991) as "Ecologically sustainable development can then be thought of as changes in economic structure, organization and activity of an economic ecological system that are directed towards maximum welfare and which can be sustained by available resources." This definition explains that the welfare of the people is to maximized with minimum usage of resources which are in availability and this can be achieved by various changes in economic structures and activities.

Barbier E. B. (1987) has given another definition of urban sustainability which is more of inclusive nature. "Sustainable economic development...In general terms, the primary objective is reducing the absolute poverty of the world's poor through providing lasting and secure livelihoods that minimize resource depletion, environmental degradation, cultural disruption, and social instability." This suggests that sustainability can be achieved by poverty alleviation which can be achieved by giving the poor people secure livelihoods which will not consume much resources, not degrade the environment and bring in social and cultural togetherness.

The above stated definitions have talked about urban sustainability in various contexts: WCED's "meeting the needs", Rees' "environmental sustainability", Pearce's "environment friendly waste disposal", Allaby's "economic sustainability", Braat, L.C. and Steetskamp's "welfare aspect of the sustainability", Barbier's "poverty alleviation". A complete definition can be formed using all the above definitions for urban sustainability for our purpose.

Hence we can conclude as, "Urban sustainability can be defined as the development which meets the needs of the present without compromising the ability of the future generations by protecting the environmental quality and safeguarding ecosystems by non polluting ways of waste disposal which are faster than their production, economic sustainability by having organisations that maximize the economic output and improve the welfare of the people and helps in poverty alleviation and social integration."

### 2.1 Need For Urban Sustainability

It is estimated that over 50% of the world's population now lives in urban areas and that this will rise to 70% by 2050. This is a tremendous change which will have an impact both on the millions of people that move and on the cities that they move into. Worldwide, urban based producers and consumers account for the most fossil fuel and other non-renewable resource consumption and most greenhouse gas emission. This is because of the concentration of the world's industries and of middle and upper income household in urban centres [*Environment and Urbanization, Vol. 4, No. 2, October 1992*]. Therefore, there is an urgent need to draw our

focus to making a sustainable urban environment for the future generations to come and to use what we have at present wisely.

Due to increasing urbanization, larger cities have higher dependence on motorized transport. There are many problems that have been coming up such as climate change, loss of biological diversity, global warming and disaster risks. So this alarms the need to focus on sustainable cities and human settlements, sustainable transport, sustainable consumption of resources and production.

Also in the process of development of cities there is a huge increase in the number of urban poor and there are large numbers of slums that are coming up because of this. So in order to bridge the gap between the rich and the poor by providing for equitable distribution of benefits and problems of development, urban sustainability is required.

### 2.2 Indicators of Urban Sustainability

The definition of sustainability talks about wise use of the renewable resources, however there is no signal on how to measure the state of natural resources and the sustainability of their usage at a given point of time and make them known to the urban communities. Many national and international organizations are developing various indicators to determine urban sustainability. These include The United Nations Centre for Human Settlements (UNCHS), UN Commission on Sustainable Development (UNCSD), The World Bank, Organisation for Economic Co-operation and Development(OECD), World Health Organisation(WHO) and European Environment Agency(EEA).

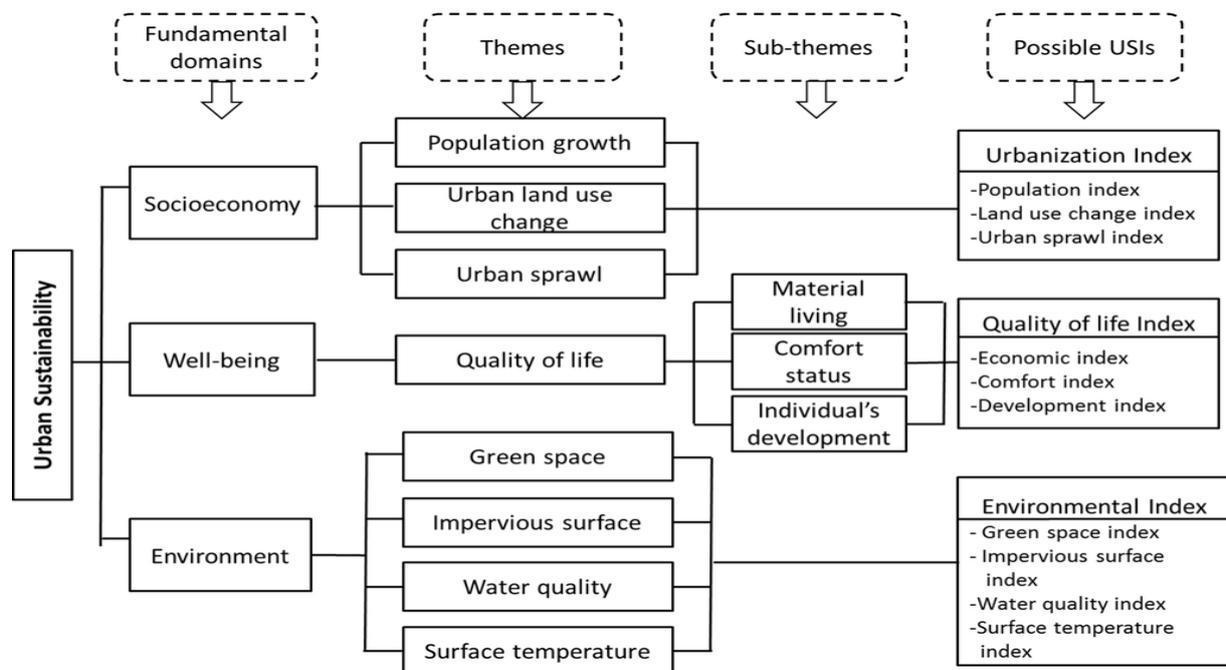
The indicators should be able to determine the following three elements of urban systems:

- a) Factors that describe urban and environmental systems and how they are interlinked.
- b) Objectify and measure these interrelationships
- c) To generate behavioural responses for the systems performance at individual and institutional levels.

As we have discussed above the various definitions of urban sustainability the urban sustainability can be concluded to exist only when:

- a) Rates of use of renewable resources do not exceed replacement rates.
- b) Rates of use of non-renewable resources do not exceed rates of development of renewable substitutes.
- c) Rates of pollution emissions do not exceed the assimilative capacity of the environment.

*[Source: Measuring Urban sustainability, Marina Alberti]*



**Fig 2: Indicators/ Indices of Urban sustainability**

[Source: An Integrated Model Based on a Hierarchical Indices System for Monitoring and Evaluating Urban Sustainability]

### 2.3 Parameters of Urban Sustainability

The parameters of urban sustainability define the scope of the process of sustainable development. The parameters help to determine a quantitative measure to define sustainability known as the sustainability index. They also work as measuring factors for determining the level of sustainability. The vast concept of sustainability can be initiated by including these basic points in planning approach. The parameters governing the sustainability index are listed below-

1. Energy – Efficiency, Conservation, Clean generations / renewable energy
2. Water – Conservation, Storm water, Waste water
3. Land use planning – Smart Growth, Ecologically sensitive zoning
4. Pollution Reduction - Air pollution prevention, Removal of lead and asbestos
5. Food - Local agriculture, Farmer market, Community garden
6. Waste – Recycling, Composting, E- waste recycling, Solid waste reduction
7. Green Infrastructure – Trees planting, Green roofs, Storm water management, Land/ habitat conservation
8. Transportation /Accessibility – Bicycle programs, Pedestrian programs, Reducing car use, Enhancing Public transit

### III. PROBLEMS IN ACHIEVING URBAN SUSTAINABILITY

The speed and scale of increase in the size of the cities and metropolitan areas is creating enormous stresses on the immediate and surrounding environment. Due to this ever-growing demand, the gap between infrastructure delivery and infrastructure demand is increasing day by day. Due to which the city tends to attain a haphazard

growth pattern. This un-directional growth poses major challenges for sustainable development of any city. The provision of facilities is insufficient by the authorities responsible, due to which people adopt their own measures to look for a supplement for them which may or may not be sustainable in long run.

### 3.1 Problems of Governance and Management

Urban local bodies being the primary agencies for administering the infrastructural needs of the people have the responsibilities to make major capital investments. But due to the lack of coordination between various local bodies the output of the overall investments is minimal. These bodies are dependent on a limited revenue base which is governed by the upper level government or the State Government. Hence the revenue expenditure cannot meet the overall infrastructure demand. Due to the poor credit ratings of these Government institutions, they have failed to bring the private investments in infrastructure development of a city.

The predicament in delivery of urban service in a country is the result of the neglect of urban planning and infrastructure by state governments, the fragmented and overlapping institutional responsibilities of the state government, ULB's, Development Authorities, Parastatal agencies in different state.

## IV. A PROBABLE SOLUTION

We need an integrated sustainable development because it connects social, economic and ecological objectives and because it incorporates technologies that span the energy, water, sanitation and building materials fields; 'Sustainable' because of the commitment to a long-term vision of social, economic and ecological sustainability; and 'Developmental' because of the anti-poverty and local economic development objectives.

## V. ROLE OF PLANNERS

Urban Planners can contribute to overall sustainable planning by making a city self reliant in order to enhance the Quality of life of the people, by attaining various sustainability parameters through policies and spatial interventions such as efficient land use planning and proper transportation arrangements. Urban planner plays key role in urban development of any city. So, urban development should be guided by a sustainable planning and management vision that promotes interconnected green space, a multi-modal transportation system, and mixed-use development. Diverse public and private partnerships should be used to create sustainable and livable communities that protect historic, cultural, and environmental resources.

An urban planner plays a chief role in making policies and planning infrastructure facilities for the city. So they have an upper hand in making cities to fulfill sustainability parameters as their policies helps in decision making and aims to improve overall quality of life.

The role of infrastructure in advancing sustainable development is very important. So, to fulfill the parameters of sustainability, Planners and other professionals have a challenge to form the policies and design infrastructure in such a way that it improves the overall Quality of Life of the people, optimize the usage of natural resource and protect the natural environment.

Technology has a large part to play in enabling positive outcomes for cities, so the planners are required to integrate the technology with the infrastructure planning to get positive outcome. So, the work of planners is to ensure the full and rapid transformation of our society towards universal and holistic sustainable development.

### VI. CONCLUSION

Urban Sustainability can be achieved by developing a proper integrated system which can join the social, economical and environmental aspect of any city. With public participating in decisions, policies inviting private players to invest in infrastructure and pollution free environment, we can have a sustainable base of growth in our cities.

In order to attain the concept of sustainability in Indian cities, we need to improve on various parameters of urban sustainability. Few of them are listed below –

- a) Improve urban water management with particular focus on storm water and urban runoff to achieve sustainable water quality and conservation outcomes.
- b) Improve resource conservation through effective waste management, avoidance, reuse, recycling and support for sustainable products and services
- c) Improve and protect urban bush land and creeks, urban wildlife and habitats of rare and endangered flora and fauna
- d) Improve the quality of the local urban environment, through integrated approaches that address a combination of the following examples: air quality, noise, odour, chemical use, biodiversity, litter and dumping
- e) Improve the sustainability performance of local councils, small businesses and community organizations and householders in urban areas.
- f) Improve overall Governance through proper policy implementation.

### REFERENCES

- [1] Environment & Urbanization, Vol. 11, No 2, October 1999
- [2] Marina Alberti, Measuring Urban Sustainability, Center for Conservation Biology, Stanford University, 1996
- [3] NIUA, Report on Urban Infrastructure and Services, Summary and Recommendations, National Institute of Urban Affairs, New Delhi, 2011.
- [4] Golam Rahman, Deanna Alam and Sirajul Islam, City Growth with urban Sprawl and Problems of Management, 44th ISOCARP Congress 2008
- [5] A sustainable planet, Environment and Urbanization, Vol. 4, No. 1, April 1992
- [6] Jamie Montague Fischer and Adjo Amekudzi, Quality of Life, Sustainable Civil Infrastructure, and Sustainable Development: Strategically Expanding Choice, Journal Of Urban Planning And Development, March 2011