International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 02 | Feb 2021 www.irjet.net p-ISSN: 2395-0072

The Eco-city Approach to Sustainable Development in Urban Areas: A Case of Valsad City

Rushvi Patel[1]

[1]Student, Master of Town and Country Planning,
Sarvajanik College of Engineering and Technology, Surat

Abstract - *City plays a prevailing role in global consumption, production and pollution. Unless cities of the future are developed in a planned eco-friendly manner, the future demand will place unsustainable exertion upon the existing urban infrastructure network. Thus, planning existing urban cities and its related new urban development more environmentally based and livable is an urgent need in the world push for sustainability. The Eco-city initiatives gained global importance in the recent years in response to the growing urbanization and to reduce the burden on the environment. Eco-city is "the city that enhance the well-being of citizens and society through integrated urban planning, decreases environmental burden and helps in achieving sustainable development". The key performance indicators responsible for Eco-city are identified and analyzed to show as how the environment in the cities is being degraded due to unplanned development and increased human activities in the urban areas. This approach has focused its efforts on four key urban sectors: (i) Land-use patterns (ii) Urban Transport (iii) Green space (iv) Energy Efficiency and Renewable Energy. Thus it involves wide variety of solutions such as mixed-use urban form, environmentally compatible land-use planning, high density, favor of cycling and walking infrastructure, protection of green areas, Green buildings and many more. Thereby suggesting the remedies for improving urban surroundings of Valsad city, possibilities to improve greenery, the re-alignment of transportation routes, re-shaping of public realms, modified land use pattern, solar/passive built forms. Therefore, Eco-city aim to attain a balance between the development of urban areas and protection of the environment by decreasing the environmental damages and depletion of non-renewable resources.*

Keywords: *Eco-city, Sustainable development, Valsad city.*

1. INTRODUCTION

The world is getting urban gradually. The number of urban inhabitants is predictable to grow continuously, especially in developing Asian countries like India. Some 1.1 billion people are predicted to move into Asian cities in near future [1]. This includes 11 megacities with a population exceeding 10 million such as Beijing, Shanghai, Kolkata, Delhi, Jakarta and Tokyo. Such expanding urban population will require a whole range of infrastructure, services, housing and jobs, including land. This is expected to pressurize agricultural land supply, increase the traffic volumes and pressure on the environment. These developments are very unsustainable for the country and the rest of the planet. Census of India, 2011 revealed that 31.16% of the country's population lives in urban areas i.e. around 37 crore population. The urban residents is expected to rise around 40% by 2026. As Indian's cities continue to rise demographically and spatially, the challenges regarding infrastructure and land are increasing. Today, most Asian cities are characterized by the following unsustainable trends: [2]

- An existing building which is obsolete and not energy-efficient;
- Structural problems e.g. widening of large shopping malls but deficiency of non-commercial, catalytic, mixed-use, socially sustainable city projects;
- Depletion of urban green space;
- High carbon energy supply due to burning fossil fuels for creating energy;
- Inefficient water, waste and transport operations convoyed by population growth.

Such unsustainable practices are leading to higher energy prices and increased emissions of carbon dioxide (CO_2). The environmental conditions are more degraded in the developed world and are getting worse in developing world, especially in the fast growing economies of China and India. The global shift of manufacturing industries from advanced nations to developing countries is also transferring sites of industrial and household wastes, and carbon emissions to the developing world. [3]

There is a need to direct urban development towards minimizing the use of land, energy and materials, and deterioration of the natural environment while maximizing human well-being and quality of life. In such situation, implementation of planning process which promotes sensitive urban development for preserving the open space for developing green areas and the ecological integrity of land and water becomes essential. This can be achieved through Eco-city planning.

The eco-city protects and even improves the environment. "Eco" in "eco-city" means the harmonious relationship between people and their natural and social environment while "City" means an integral organic body made up of nature and people [4].

It is also referred to as a 'sustainable city' or a 'green city' or "clean city". It suggests an ecological approach to urban design, management and towards a new way of lifestyle. The Eco-city programme was conceptualized for improving environment and achieving sustainable development through comprehensive urban improvement system employing practical, innovative and nonconventional solutions.

Figure 1: Haikou Eco-Smart city design
(Source: mcmorrowreports)

An eco-city is an ecologically healthy city. We do, however, see hints of eco-cities emerging in today's solar, wind and recycling technologies, in green buildings and green businesses, in urban environmental restoration projects, urban gardening and organic farming, and in individuals using foot, bicycle and public modes of transportation in preference to the automobile. Car-free urban centers, "mixed use" and "balanced" development projects represent land use and architectural changes moving in the right direction, too.

Aim

To improve the quality of life and reduce negative impact on environment by providing innovative sustainable approaches, techniques, land-use solutions and urban planning regulations.

2. STUDY AREA

2.1. Location of Study Area

Valsad city is located at the southernmost corner of Gujarat State, between 72.73` to 73`Longitude at Eastern and 20.07` to 21.05` latitude at Northern side near Gulf of Khambhat and Arabian Sea. The district head quarter is at Valsad City.[5]

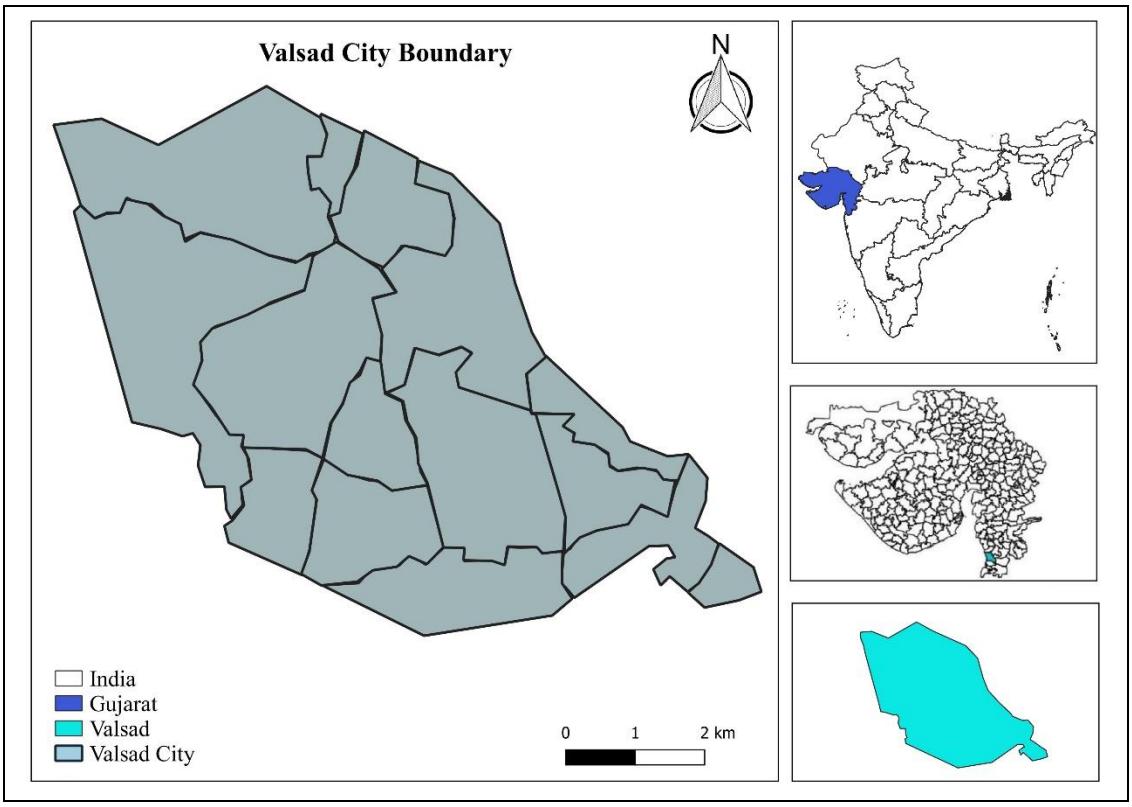

Figure 2: Location of Study Area

2.2. General

Valsad city is located at the southernmost corner of Gujarat State near Gulf of Khambhat and Arabian Sea. The district head quarter is at Valsad. Moreover, there are 4 other taluka namely Dharampur, Pardi, Umargam and Kaprada. Vapi is the main chemical based industrial hub located at a distance of 35 km from Valsad. Valsad is Geographically situated on the Southernmost part of Gujarat, between 72.73` to 73`Longitude at Eastern and 20.07` to 21.05` latitude at Northern side.

2.3. Geography

Valsad district is one of the 33 districts of the western Indian state.

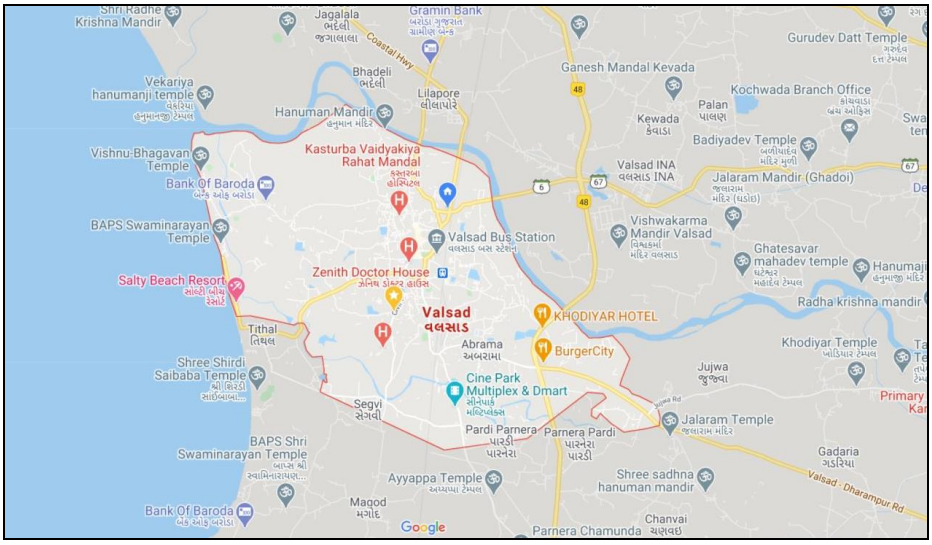

Figure 3: Map of district

(Source: www.valsad.nic.in)

Table 1: Geography of Valsad City

Average Rainfall	1500 mm
Average Temperature	26.9 °C
Seismic Zone	Zone III
Major Rivers	Auranga, Wanki
Beaches	Tithal Beach

(Source: www.valsad.nic.in)

2.4. Demography

The district covers 2947 square kilometers and is divided into six talukas: Valsad, Vapi, Pardi, Umargam, Kaprada and Dharampur.

Table 2: Demographic profile

Demographic label	Value
Area	2947 sq. km
No. of Taluka	6
No. of Gram Panchayat	384
No. of Municipalities	5
No. of Villages	470

(Source: www.valsad.nic.in)

2.5. Population

In 2011, the population of Valsad was 1,705,678 of which males and females were 887,222 and 818,456 respectively. Population of Valsad city is 4,15,140.

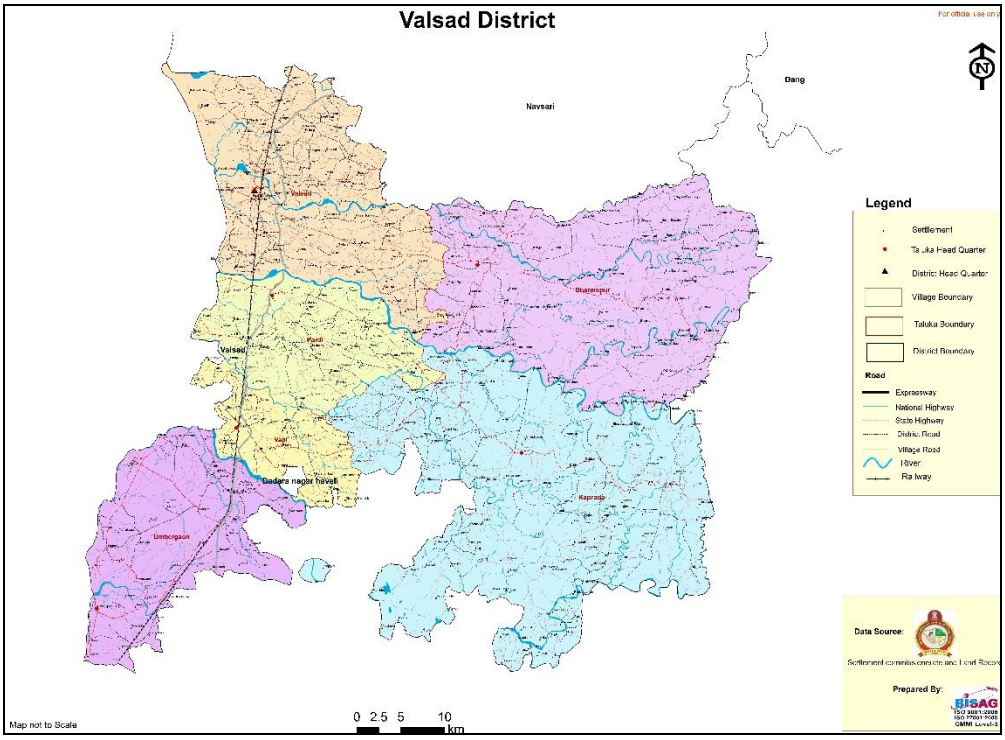

Figure 4: Valsad district map

(Source: landrecords.gujarat.gov)

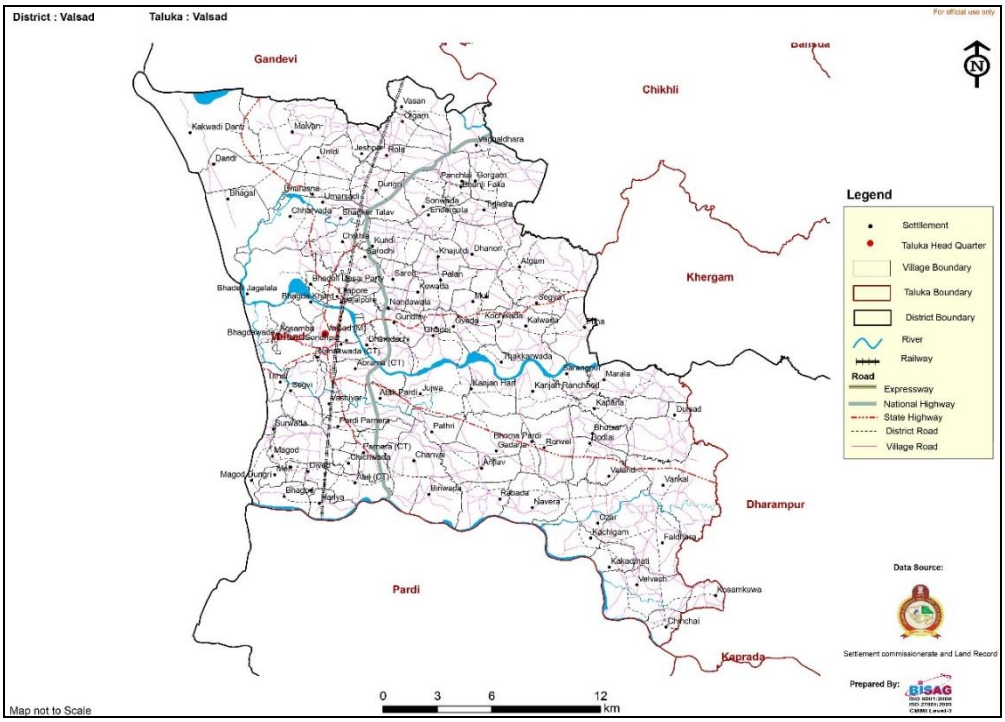

Figure 5: Valsad city map

(Source: landrecords.gujarat.gov)

4. ECO-CITY APPROACH

An eco-city is an ecologically healthy city. Eco-cities share basic characteristics analogous to healthy ecosystems and living organisms. An eco-city is an ecologically healthy human settlement modelled on the self-sustaining resilient structure and function of natural ecosystems and living organisms.

Historical context	• Built on "Garden City" concept
Ideology	• Reaction against classical polluted, overcrowded city
Built environment	• Walkable, pedestrian friendly streets, neighbourhoods, city centres • Separate but closely connected work and residential areas • Green belts, Recreational areas, open air

The ten critical eco-city dimensions discussed here are the following:

1. The city has a compact, mixed-use urban form that uses land efficiently and protects the natural environment, biodiversity and food-producing areas.
2. The natural environment permeates the city's spaces and embraces the city, while the city and its hinterland provide a major proportion of its food needs.
3. Freeway and road infrastructure are de-emphasized in favour of transit, walking and cycling infrastructure, with a special emphasis on rail. Car and motorcycle use are minimized.
4. There is extensive use of environmental technologies for water, energy and waste management – the city's life support systems become closed loop systems.
5. The central city and sub-centres within the city are human centres that emphasize access and circulation by modes of transport other than the automobile, and absorb a high proportion of employment and residential growth.
6. The city has a high-quality public realm throughout that expresses a public culture, community, and equity and good governance. The public realm includes the entire transit system and all the environments associated with it.
7. The physical structure and urban design of the city, especially its public environments, are highly legible, permeable, robust, varied, rich, and visually appropriate and personalized for human needs.
8. The economic performance of the city and employment creation are maximized through innovation, creativity and the uniqueness of the local environment, culture and history, as well as the high environmental and social quality of the city's public environments.
9. Planning for the future of the city is a visionary "debate and decide" process, not a "predict and provide", computer-driven process.

10. All decision-making is sustainability-based, integrating social, economic, environmental and cultural considerations as well as compact, transit-oriented urban form principles. Such decision-making processes are democratic, inclusive, empowering and engendering of hope.

Parameters feasible for Valsad city	Proposals
Sustainable mixed land-use	Compact
Road Infrastructure	Walking/Cycling
Urban green space	Parks, Gardens, Roof
Passive housing techniques	Solar, Green buildings

5. RECOMMENDATIONS

- Applying sustainable land use pattern in the city
- Change the transportation patterns by providing infrastructure related to walking and cycling.
- Identify suitable sites in the city where urban green cover can be planned, managed and sustained.
- Changing the functioning of Government Commercial buildings by converting it to passive forms.

REFERENCES

[1]S. Kallidaikurichi and B. Yuen, "Developing living cities: From analysis to action," Dev. Living Cities From Anal. to Action, no. June 2010, pp. 1–299, 2010, doi: 10.1142/7722.
[2]S. Lehmann, "Green Urbanism: Holistic Pathways to the Rejuvenation of Mature Housing Estates in Singapore," Earth Environ. Sci. Earth Environ. Sci., 2011, [Online]. Available: doi.org/10.1007/978-94-007-0383-4_8.
[3]J. Randolph, Environmental land use planning and management. Island Press (Washington, DC.), 2004.
[4]Z. Linan, Y. Bolin, and X. Mingzhfi, "Management strategies for ecocities of sustainable development," Chinese J. Popul. Resour. Environ., vol. 2, no. 1, pp. 61–63, 2004, doi: 10.1080/10042857.2004.10677352.
[5]"Valsad District." www.valsad.nic.in.