Development of Sustainability Index for Urban Area: 
A Case Study of Bardoli Urban Area

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Abstract: As urbanization take place in cities it is need to save our suburb city which are until now good in environmentally, economically and socially. To make them strong concept of sustainability is the main constituent to make it sustainable hence impact of urbanization we can mitigate. For measuring sustainability of suburban or urban city of Surat which is Bardoli introduces sustainability index. This paper leads to plan and develop sustainability index which also has there three parameter Social, Environmental and Economic. After that index find out how we can sustain urban area and its planning proposal take place to sustain in future with little impact of urbanization.

Index Terms - Sustainability Index, Sustainable Development, Social Sustainability, Environmental Sustainability, Economic Sustainability

I. INTRODUCTION
Sustainable index are an effective mean of determining if the city is moving towards sustainable development. Sustainability is majorly essential for the future growth of the city to sustain present as well as future tomorrow. Sustainability is blissful for the city planners, citizens, educational institutions, environmental progress towards less pollution and economic opportunities for the citizens as well to sustain government. The objective of this dissertation is finding sustainability index which linked to city planning and propose planning proposal for lacking indicator of sustainability after analysis of sustainable indexes for the Bardoli city. Moreover sustainability index is calculated for the three dimensions and Bardoli as a whole. Three dimensions of the sustainability considering are as social, environment and economic. Indicators of these three dimensions are based on which fall under individual dimensions. From these dimensions and their indicators will help to urban planning for future planning of the city. Such index should be regarded as a basis for assessing Sustainable Development in Bardoli city.

II. LITERATURE REVIEW : SUSTAINABLE INDICATORS
Sustainable indicators are an effective means of determining whether city is moving towards Sustainable Development. Sustainable Development leads to relationship between environment and also economic point of view. In practice of sustainability it focuses on the finding methods to promote growth which will not damage to environment and future generation will use natural resources. Sustainable Development have positive benefits to the society and also city like it increase quality of life, also objective healthy environment, good employment opportunity, compact city form, better physical services like mass transportation, foot paths, school, colleges and green park etc.

III. SOCIAL INDICATORS
Mass There are many realities of this indicators. Most prominently is consciousness of and legislation safety of the health of people from pollution and other injurious events of organisation and other business. The major element is education - inspiring people to take part in to environmental sustainability and educate them about the effects of environmental protection as well as warning of the dangers if we cannot achieve our goals. The last issue for the people in this era is how to improve the living conditions of residential buildings and sustainable materials. “Development of Social Sustainability Index and Improving Planning Proposal for Bardoli Town”
IV. ENVIRONMENTAL INDICATORS

Urbanization has been rising day by day, it needs to be protected by environmental restoration, reducing energy consumption by switching off electronic devices rather than waiting, and traveling a short distance to the bus. Companies are arranged to avoid pollution and keep their carbon emissions low. There is an incentive for home and enterprise to install renewable energy sources. Protecting the environment is the third pillar and for many people the main concern for the future of mankind. It identifies the need for ecosystems to examine, protect, evaluate the quality of air, the integrity of our resources and the sustainability of our resources, and to pay attention to environmental issues.

v. ECONOMIC INDICATORS

This is the issue that shows the most difficult as most people disagree on political ideology what is and is not economically capable, and how it will affect employability, businesses, and jobs. It is also about providing encouragements for organisations and businesses to follow to sustainability guidelines beyond their normal governmental requirements. Also, to inspire and foster encouragements for the average person to do their bit when and where they can; one person cannot achieve a lot, but if it is accepted as a group, the consequences will be cumulative in some areas.

VI. PROBLEMS IDENTIFICATION

a. According to Surat Urban Development Authority (SUDA) Development plan 2035 it will increase its boundary and Bardoli will coe closer to it. So need for to sustain it as well to decrease impact of SUDA.

b. Nearby area of the Bardoli there are sugar factories which degrade water of mindhola river as well as air pollution.

c. Population increase day by day through surrounded villages. Hence it create population load in economic opportunities for the people.

a. Vadodara-Mumbai Expressway passing nearer to the Bardoli which cross to National Highway-53 which cause negative impact on Bardoli city which will degrade environment and forest area.
   • In Vadodara-Mumbai Expressway the total land acquisition of the Surat is 688.561 Ha.
   ➢ Total length of expressway 378.722km.
   ➢ In Gujarat total length 260.40km
   ➢ In Surat total length 57.3km
   • It comes under area of village in Bardoli as follows with their forest area
   1. Naugama: 0.354 Ha
   2. Ninat: 0.481 Ha

VII. METHODOLOGY

This study investigates all the weak points of the Sustainable Development Index to enhance them new method by effective indicators can cover all the problems related to non-renewable energy sources. Proper implementation of these indicators can make high quality of life of humans. Prosperity of the humans may also depend on the mass transportation because it creates positive impacts on the environmental.

Providing affordable and easy energy is essential for all city residents. Providing new technology and create right policy which effective to gain affordable and proper energy. Sub indicators of the sustainable energy index are environmental impacts, renewable energy, transport, and use of energy, resource access of energy, resilient, policy and safety.

In social sustainability development considering demography which have high population growth rate puts pressure on services, infrastructure and economic opportunities. Education which indicate by school enrolment rate primary and secondary school, access to advanced education and student/teacher ratio in primary and secondary school. Health which indicate to birth rate, infant mortality rate, child mortality rate and death rate. Equity indicates child labour and sex ratio for work participation rate. Housing cover land price per income ratio, % of housing on unauthorised land and housing shortage.

To accommodate more parks in lesser land parcel it will take concept of small parks by introducing it in square enclosing public or private building. They are provided in the dense business or residential area where land is costly or not more available. So that advantage of it taken by all the users of it and also it will increase aesthetic view of the property. For taking more advantage of the green part it can be applied in
the landscaping of rotary, footpaths, walkways, buffer zone part for divide two zone in green manner, and also boundary roads of the city make landscaping by green belt. It will create environmental sustainability to make city sustainable.

VIII. CONCLUSION

The aim of this paper to make Bardoli city sustainable with reduces impact of environmental degradation due to nearby urban area. Making city socially sustainable with increase housing conditions, education level increases with proper school, reducing poverty with increase job opportunities. Developing city as economically sustainable by increase transportation facility up to work place to home, increases economic stability by decreasing unemployment rate with increasing average personal income.

REFERENCES