



## Urbanization and Environment in a Sustainability Framework –A Study of Dehradun

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*(Received 22 November, 2017 accepted 20 December, 2017)*

*(Published by Research Trend, Website: [www.researchtrend.net](http://www.researchtrend.net))*

**ABSTRACT:** Increasing trend of high-rise and high-density unplanned building in a city like Dehradun which is not ready to take extra loads is resulting in dilapidation. This opens up new challenges for planners, architects, engineers, and environmentalists. An integrated developmental approach to handle these issues is urgently needed for sustainable development of Dehradun. For better growth of the future, the problem now aims at finding out sustainable solutions for urban population keeping in view the environment related issues. Optimizing the use of construction material by encouraging the use of locally found/recycled materials and reducing the waste generated in the building construction should be practiced. Green architecture, environmental friendly and energy efficient building is necessary for the sustainable development. This paper deals with the issues related to sustainable and environmental architecture, with possible solutions.

**Keywords:** Design; Efficiency; Environment; Green; Sustainable.

### I. INTRODUCTION

When we talk about Urban, it tends to define the character of a city and city life. The term urban portrays the habitation, sustainability, architecture, socio-culture, and most importantly our surroundings the place where we live.

“Stones make a wall, walls make a house, houses make streets, and streets make a city. A city is stones and a city is people, but it is not a heap of stones, and it is not just a jostle of people. In the step from the village to the city, a new community organization is built, based on the division of labor and on chains of command”. - Jacob Bronowski 1973: *The Ascent of Man*.

A city with reference to urban and Architectural context is the environment where the user can breathe fresh, see clean and hear peace. The built and un-built spaces of the city are designed and organized in such a manner that the development in the aspect of sustainability, durability and neutrality, can take place positively.

It would not be wrong to state that cities are one of the great achievements of Architectural, technological, cultural, social and artistic exertion. The key motive of this paper is to represent the ongoing situations of Dehradun city in which we are living in and response of

our habitation towards sustainability and development of the architectural and urban environment. On the basis of present scenario of our city's unplanned growth, irrelevant construction methods and frequent disobedience of building bye laws we are heading towards an environment where basic needs would be like a war to win each and every day. Our surroundings will be in a way that we would not be able to breathe, where humanity will be on stakes and civilization will be on downfall.

Dehradun is a city surrounded by Himalayan and Shivalik range where vegetation, natural breathing spaces and favorable conditions are accessible within which a society can sustain and breathe. Further, this city is growing, in aspects of population and unreality. The city which was once having ‘Mix Architectural’ features within the buildings, natural slopes for drainage, rivers and rivulets, landscape and balanced socio economic culture, is growing in an unplanned way. Even after the interference of government development bodies that started acting to regulate the growth of the city in a particular perspective, this city is becoming something which we can call the un-urban or unplanned city.

Issues developing from past fifteen years are eye openers for the authorities to see things from different windows of perception and the haphazard image of this city should at least be rendered in a manner so that it can achieve the form which we can look at and appreciate. Construction methodology, sustainable use of both land and materials used in construction, green environment and cleanliness are some of the focus areas that need to be pondered upon so that the situations can be modified and improved to achieve urban and sustainable environment.

## II. NEEDS AND ISSUES

Dehradun, where 'Dehra' means camp and 'Doon' means valley, is situated at the Himalayan foothills in Doon Valley. The place which is one of the most cherished due to its natural environment, is considered as one of the favorite residential cities.

Dehradun is at a cross road at the moment. Being the capital city, it has major impact on existing activities and infrastructure as well as the existing built-up areas. The magnificent old colonial bungalows of the city are being consumed slowly by the thriving commercialism leading to the ugly accessorized and glass structures. Due to the scattered settlement which is mostly of the mohallah type (organic growth), a fair contrast can be noticed between the native city and the colonial development. No attempts were made to govern the disorganized expansion in area and population, emerging in dilemmas like unchecked traffic and transportation, procreation of slums on lowlands and seasonal streams, encroachment of commercial activities, congestion in central core of the city area, environmental degradation, contaminated living condition, declining forest cover over time.

Though, it is Uttarakhand provincial capital which is well known for its rejuvenating climate and natural beauty, it is so filthy that it ranks lowly at 26, among the list of 29 state capitals of India assessed for cleanliness. And among 476 cities surveyed it stands at 360th position. This "dismal ranking" has not surprised those associated with the sanitation work in state capital and piles of garbage scattered around the streets.

With the growing urbanization, the city, as well as natives of Dehradun, is facing major issues of waste generation which is a consistent process and the main problem for local authorities is how to look out the waste spreaders. There are dominating affairs of excess and arbitrary expansion, congestion in core city areas, unidentified variation in land uses, the inadequacy of developed land for affordable housing and individualistic land uses in both core city and newly developed areas leading to an unfeasible position. As per the compiled information from the local residents

"The piles of garbage visible in the city speak for themselves. The authorities' claim to have taken the measures to ensure better sanitation in Dehradun is actually not adapted on the ground. From the past eight years, local people were ensured solid waste management plant but nothing has happened. And after the pathetic condition of the public toilets how can one expect a good rank?"

Although the city drainage is resolved by the natural contoured topography of the city, there are pockets of water-logging due to which many areas faces problem during heavy rains; besides, the encroachment and disposal of raw sewage into natural water courses by urban poor has rendered this sector a cause for environmental and health concern. There is no arrangement for solid waste disposal as many residents dump waste on street or in river or in drain or down the hill slope. The drains and streets in some slums are broken and many are rarely or never cleaned at all resulting in clogging. This has lead to the choking of natural drainage courses and requires immediate interference and a careful planning needs to be done to take care of environmental concerns.

Due to hilly terrains, the drainage of the city is borne by the two streams namely Bindal and Rispana Rao. Asan, Tons and Dulhani rivers also discharges in these two rivulets. The rivulets' health has degenerated due to the deposition of raw sewage on their beds. The high level of heavy metal consolidation in Bindal is booming with each passing year and water has become a depository of contaminants and toxins. Whereas water of Rispana is highly rich with minerals such as nitrate, phosphate. According to the survey conducted, the main drains are heavily silted due to the constant disposal of garbage often packed in polythene bags resulting in impregnable problem as polythene tends to slow down the fragmentation of degradable materials packed inside. Thus presently most drains are in bad shape and need urgent repairing, reconstruction and other related works.

Human encroachment is shrinking the flow of water leaving the rivers polluted and water-starved because of which the city is experiencing more floods as the drainage of the city which was once moderated by these two rivulets is now a mere drain. Thus, beautification may not help to restore the river system rather more focused and elemental actions would be needed. Thus, there is an urgent need for the revival and restoration of both the rivulets which forms the drainage system of Dehradun else it will soon lose its lifeline.

The obvious part which can't be ignored is Slums near the two rivulets, forming quite a considerable segment of the population of the city. Slum development is one of the major side effects of urbanization.

Because the city is not ready to shelter the added population and unable to provide the needed infrastructure. More population is migrating from rural to open spaces available for urban areas. This is resulting in loss of open spaces which leads to loss of biodiversity. This affects the economic development as the value of that land degrades.

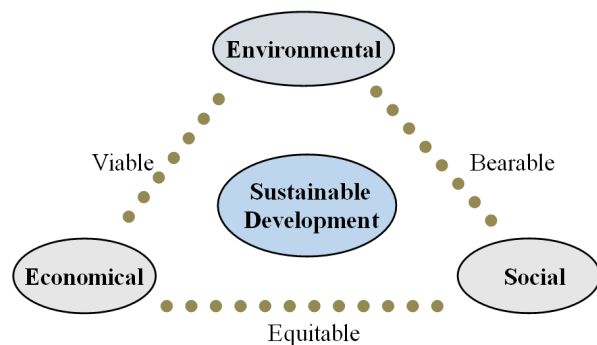
The unconstrained expansion of slums creates a lot of problems on urban infrastructure. Slums are located on land near drains, dumping grounds, roadsides or railway lines making them prone to a number of susceptibilities like displacement, disease prone or accidents. No open spaces and recreational facilities are provided. Badly designed sanitation facilities are available to them, safety and other physical infrastructure are unaccounted for and finally, they are identified by inadequate street.

The execution of analysis lead to the interpretation of various dilemmas associated with haphazard slum areas developed in the periphery along the Rispana River. Proper housing with water supply was the major problem of slum areas which creates a lot of dispute for the advancement of sustainable life. Electricity has become their basic need. The unavailability of toilets was another important indicator of the stage of sanitation resulting in open defecation and consequently the spread of diseases. Most of the drains were found open, narrow and filled with solid waste. All this along with many other issues became the cause for health related problems in slum areas. The small children of slums use to play and live in open and dirty areas that affect their health and due to the lack of amenities they are unable to find the proper health access and hospitality as a result their life is greatly compromised. Now, this is where we need to rethink about the whole story line. It seems like it is becoming a myth for this beautiful city which is surrounded by the miraculous Shivalik and mighty Himalayan ranges. This city is still fighting with the actual face which once it was having. An elegant and diverse urbanity and architecture, the natural landscape all over the streets and wondrous mountain ranges can be seen from any part of the city.

A city which has evolved itself as a fast growing city within the last 15 years, where valuable land well known for its scenic natural beauty, beautiful forests, waterfalls and surroundings, which has now become a place full of garbage and waste disposals, water logs and irrelevant construction. The whole scenario is comprehensible and threatening too. This is something which is required to be taken as self-initiative and motivation and if no urgent action is taken, then these areas would be lost out to unplanned urbanization.

### III. SUSTAINABLE APPROACH TO URBANIZATION

Here after looking into the situation of current cities, where urbanization is now defined by human encroachments into natural habitation, unplanned development, fast erecting concrete forests, lack of drinking water and contaminated natural resources so the environment, which has also been explained with the help of study of city Dehradun. We actually need to change the way we see growing cities either while designing and shaping the surroundings we live within. The fast growing urbanization adds problems to sustainability. Brundtland Commission of United Nations on March 20, 1987, defined sustainable development as, "The development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Figure 1 presents a scenario of sustainable development. It is very important to find the sustainable solutions for the viable demand of growing population and urbanization.



**Fig. 1.** Integrated sustainable environmental development scenario.

According to the Goodland (1995: 3) three pillars of sustainability are: social sustainability which can be obtained by public participation to act on social disruptions that threaten the well-being of our people and our environment; economic sustainability ensures fair distribution and efficient allocation of our resources; environmental sustainability can be achieved by protecting our natural resources from getting exploited and neglected. A city should achieve equilibrium between economic, environmental, and social necessities without damaging their natural environment to build sustainable urbanization. This equilibrium can be attained through sustainable planning. It can help in reducing the environmental hazards to a great extent. The built environment is the responsibility of the Planners, Architects and the Policy makers.

“Saved energy” is the fundamental for sustainability as “energy saved is energy produced”. William Morris in 1892 said, “The subject of material is clearly the foundation of architecture and perhaps one would not go very far wrong if one defined architecture as the art of building suitably with suitable material.” The use of material for building construction has a considerable impact on the environment and is liable for major environmental concerns. Therefore, the designers must look into some specifications like cost, maintenance, health issues in the production of building materials. India has a large source of solar energy which makes it important to explore the possibilities. To conserve energy we need to switch to renewable sources. Biomass from agricultural waste and residues like straws, stems, husk, and wood can be used for power generation. Sewage sludge can be used for producing methane gas which is further used for producing green electricity. Waste water from kitchen, sinks, washing machines, can be used for landscaping. Rain water harvesting can be done for collecting water from large surfaces.

The reusable and recyclable building materials like concrete, hardware, timber and its products etc. should be used even after its useful life is over. In other words, the locally available building materials and construction techniques should be practiced. Timber is a good sustainable material as it absorbs carbon dioxide in spite of producing it. But exploitation of timber can lead to deforestation. In order to attain sustainability, the particular combination of material and energy system need to be decided depending upon factors like geography, geology and climatic conditions. It largely depends upon the economic condition of society and locally available resources.

#### IV. CONCLUSION

Here in this research paper, cities’ current situation, unsustainable and unplanned urbanization, negative impact on people and the environmental degradation can be understood with the help of live example city Dehradun. Economic, Environment and Social, three essential pillars of integrated sustainable environmental development. Which seems promising methodology to bring certain equilibrium in the situation which are most devastating and unfortunate for urban cities. With the help of adoptive psychology of ‘Taking and giving it back to nature’, surely can bring a change which will not only change current picture of the fast growing cities but will also guide forthcomings. Use of naturally found construction materials, reuse of waste materials, solid and water waste management in context of saving

environmental degradation and urban sanitation. Application of locally found materials and construction methodology are some of the guiding keys which will lead us to make a clean and sustainable city. Urban planning which will not only sustain our nature, but will also take care of needs and requirement as per availability of resources and land.

Urbanization has no end, and so, cities should be adequate enough to take up the load without arbitrating the quality of life. The problems of slums and unplanned migration of people for an occupation can be resolved by providing them with housing solutions at low cost and energy systems. This will not only provide a better living condition but can help in saving energy, that otherwise is wasted in battling problems of urbanization. Sustainable building techniques and materials can help solve the problems of survival.

Sustainability often is defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs. We are committed towards this goal by customizing the patterns of development and consumption to reduce the need of natural resource supplies and help conserve environmental quality. Construction of a building depletes more energy and resources than any other economic activity which makes it important to achieve greater sustainability.

As a sustainable and developed society, our efforts should be a long-term, integrated approach towards developing and achieving a healthy community. We should understand that the problems related to sustainable development are global as a result the issues need worldwide attention and working together can only bring change faster.

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