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Resurgence to Resilient City: Case of Pune

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Abstract: Cities are continuously changing; sometimes this change involves growth, whereas at other times it will lead to decline. Planned cities have surely given us the superficial skin of beautiful cities and ordinance of arrangement but lacking in the genesis of the place where natural resources shall be nurtured.Therefore this paper will show the issue of degrading hills of Pune and susceptible strategies to shift the range of perspective towards looking at cities from "economic entities" to "adaptive ecosystem", in order to sustain during urbanization and put a mark towards agenda of Resilience city.

Keywords:**Urbanization, adaptive ecosystem, resilience.**

I. Introduction

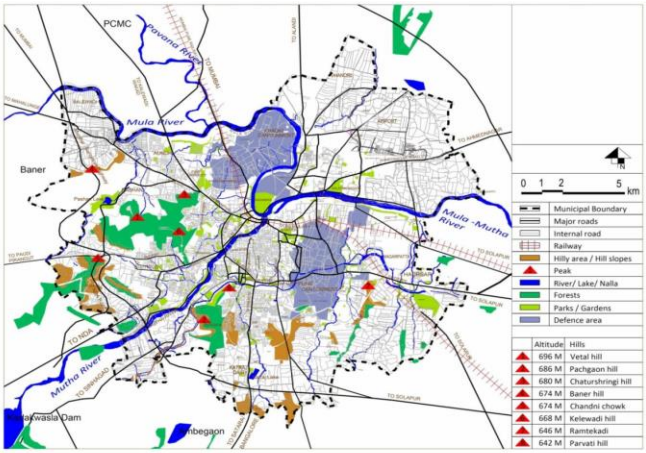
Urbanization, in precise terms, indicates to the process through which society is transformed from rural to urban areas. It is broadly defined as a growth of towns and the increasing ratio of rural to the urban population of a country. Urbanization usually brings with it a regional prosperity alike the provision of infrastructure facilities within urban system. In other defined zone urbanization – the spatial expansion of the built environment that is densely packed by people as well as their socioeconomic activities and products – is one of the most prominent features of the modern civilization of humanity. Human domination, however, became the prevailing theme in human society's interactions with nature for more than two centuries particularly after the industrial revolution in the 18th century. During the era of frantic acquisition of natural resources, rapid economic growth, and copious technological innovations, the world underwent fundamental socio-cultural transformations. Therefore it becomes important on the part of local government to provide resilience against this kind of urban distress, emerging in the natural landscape of the city due to urbanization.

Pune City as an Economic entity:

Pune is Seventh largest city in India after Mumbai. Pune municipal jurisdiction has extended area up to 243.84 sq.m Pune is having a population about 5 million at current seen and it caters housing for 2.54 million population within 144 wards this city has the long-standing urban condition. Today it is known as a 'Cyber City' because of major IT centre located in outskirt of city.

Pune as an economic as well as ecological entity: Pune is the cultural capital of Maharashtra state geographically it is situated on leeward site of Deccan Plateau which is part of Sahyadri Hills or the Western Ghats. It is located between 18º 32' North latitude and 72 º 51' East longitudes. The city is located at the confluence of Mula and Mutha river's which are plains of Bhima and Nira River basin at a height of 560 m above mean sea level and characterized by vast stretches of undulating plains inter spread by low and medium ranges of hills.[iii] Which results in topographic plains within ecological boundaries of a city. Thereby the city consists a network of water channels which located along the undulating terrain plains of land which indulges the natural beauty around the regional boundaries of the city. The hills provide habitat for several winter migratory birds. Five species of birds recorded in the foothills are endemic to India and are found nowhere else in the world.

Today the landscape of hills has been deteriorated due to increasing city growth and expansion.[i]



Map No. 6-1: Physical feature map of Pune City

Image Source: *Revised Development plan Pune, 2041.*

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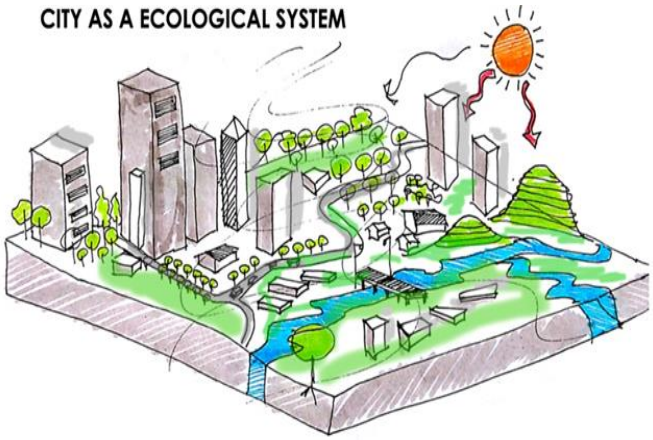


Current state of development around Vetal hill

How hills plays major role in Urban Ecology:

-Hills are a geomorphological ancestor and protectors of a city.

-They are conveyers for watershed through streams and responsible for the formation of river basins along with ridges and valleys.

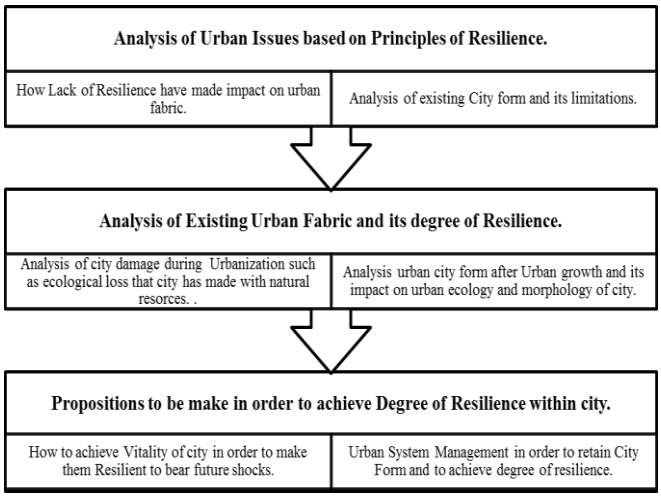
-They act as a landmark for various kinds of birds and wildlife.

-They carry forest regeneration and its cyclic process.

-E.g: Hills are habitat for various migratory birds, insects, wildlife, trees, and medicinal plants.

-In an urban environment, they are part of the urban landscape and mostly act as scenic beauty for the city.

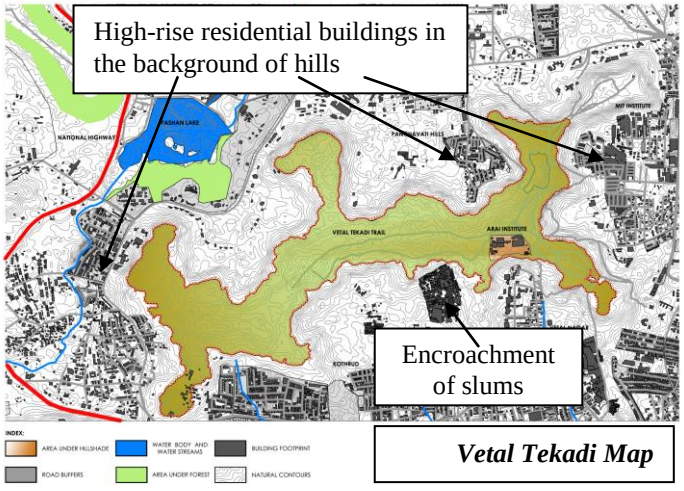
II. Framework and Methodology to understand the lack of resilience in the city.



This framework derives about how the cities are lacking in urban management and this will be analyzed through various aspects of urban transformation. Also in order to make cities more adaptable to future shocks and against endogenous, exogenous pressure. And to meke our cities more adaptive we need to make them resilient towards the urban distress caused by urbanization. Urban resilience embraces a wide range of adaptability towards the future shocks of urbanization which moves around the built fabric of city. As per the methodology here, the analysis of all the seven hills has been done based on the visual survey, where the case of every hill has been studied in detail to identify the issues around hills.

III. Results in terms of Issues identified

Analysis to identify issues around the Vetal Tekadi:



The Hills environment in the city is subject to intense pressure due to development and encroachment.

Pune had grown towards North West region where major natural resources are located and this growth has occurred mainly

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because of the kind of economic opportunities that city has offered in suburban areas and also because of the migration from congested core areas of a city.

The mounting concrete structures due to these developments have resulted in the loss of green covers on the hills which are resultant of the increasing grey areas and deformation of natural bodies.

Encroachment along the foothill of Vetal Tekadi

Image showing development along the edge of foot hill

In Pune where directional growth directed towards North West the area and according to land cover policy 5.24 % of the area comes under hills and slopes, which is part of jurisdiction boundaries of the city and therefore these natural slopes have become part of city development proposal where new transit routes have been introduced along the edges of hills, natural streams and forest cover.

Land use policies have been implemented along river edge and on hills in 1978 where the major permission was given for residential buildings and institutional buildings.

Towards north side of the city, the satellite town had been developed past 25 years ago, today it is known as a Pimpri-Chinchwad with a new sectorial development, mainly dedicated to the industrial development and IT industries which again has made strong presence along the hill range. And this has made slightly a partial segregation in land use whereupon this kind of major industries attracting the people from core city to suburban areas of Pune and therefore these hilly areas in the suburbs have become the ground for people who wanted to live in the city.

Slowly this implementation had made a major impact on natural resources which is resulting in the haphazard residential development with land defoliation around hilltops, due to which hills have lost their values within the cities.

Illegal mining which occurs at the edge of hills has been deteriorated, which has destroyed vegetation and causes to deforestation.

IV. Impact of Local Jurisdiction and bylaws

- During the preparation of DPR Pune municipal corporation has merged 23 new villages in DPR which encourage the development of peri-urban areas.
- During 2002 Masterplan new development has been proposed along the natural corridor of western ghat and within the rural embankment. A residential town had been proposed and construction of this town has included Mugaon and Dasve villages.
- After this the State government allowed 4% construction in the proposed bio-diversity park in the 23 villages merged in the PMC.
- Further, permitting 4% construction real estate rates on hilltop residential development has increased around 7000 rs per sq.ft. As per the Marshal's Slum Atlas Report, the unauthorized informal houses/ slums have come up on privately-owned lands in hilltop hill slope zone with a total of approximately 62,205 households.
- The social and natural values of this hill are under danger and encroachment along edges are increasing and thereby the value of these resources has reduced. Considering the regeneration of urban environment one needs to be look upon these hills as background to the ecological system of the city, where these natural bodies should be respected.

And therefore, all the above mentioned issues should consider as a urban issues which will require a solution in order to preserve the existing natural resources, in the city considering principles of Resilient cities.

Social issues:

These hills are part of cities open spaces where people of the city can interact and can experience the natural beauty of this monolithic space. Considering ideological face of hills they are also acting as an active landmark within city form.

At the current time, these hill and their environment has lost its sense of place, considering urban space they cater to a large number of activities during the morning and evening which is a part of a recreational activities which acts as a membrane for a social interaction within the citizens.[ii]

Also, the intrusion of gated communities within natural systems has made difficulties in running the services such as stormwater and drainage water supply lines. Many curves in the structure of these pipelines at different level due to highly contoured land cause leakages which make water loss and make defect to hygiene in the habitual area.

Thereby all these issues are amalgamating to deterioration of natural environment of a city which causes to lack of degree of resilience between the natural world and manmade world.

V. Resolution to Urban Issue associated with ecology of the city: Resilient cities

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Definition of Resilience: The power or ability of a system to absorb disturbance and reorganize to retain essentially the same function, structure identity and feedback.[1] (*Walker, 2004, p.5)* Sign of Resilient cities is ability to recover readily from disaster. The Resilient city is one that has developed capacities to help absorb future shocks to its social, economic and technical systems and infrastructure so as to still be able to maintain essentially the same function structures system. "Resilience is the capacity of a community's economic, social, political and physical infrastructure systems to absorb shocks and stresses and still retain their basic function and structure.

Principles of Resilience in cities based on mainly:[iv]

1. **Urban System of city**: Holds the power to growth of each system such as system of Nature, System of Habitat, and System of Growth.
2. **Adaptability of System**: Holds the power to adapt resilience in above system.
3. **Self-Organization capacity of city**: Holds the power to bring resilience in terms of organization.
4. **Transformability:** Holds the power to creating linkages between present and past character of city.

Characteristic of Resilient city, Sources: Taru, road to resilience, by Ashok Padalia[vi]

VII. Recommendations

In order to retain the natural resources back to city, land policies need to be altered in such a way where segregation of land cover and its implementation should exclude the biodiversity regions of city and should take necessary steps to avoid construction on hilltops, along river strips so as to preserve the natural heritage of the city.

For existing development around these hills, the most plausible options are:

1. Compaction/containment of existing places: A continuation of urban intensification processes within existing built-up areas. This includes processes such as infill development, brownfield development and redevelopment at higher densities. This will help to decrease encroachment on natural resources. The development of polycentric city regions: The development (maybe through intensification, and some planned growth) of a number of existing settlements, at a sub-regional or regional scale, based on a network based logic related to connectivity and urban function. Polycentric city regions are argued to facilitate well connected. Following these remedies will help Pune to organize the future settlements. Agglomerations that are economically and socially robust and qualitatively enrich the region (Growe, 2012; Hall & Pain, 2006).

2. Managing shrinkage: The adaptation of urban form in existing places (entire city or parts of them) shall be managed to respond to the loss of population and economic function. Processes can include targeted demolition of dilapidated buildings, provision of new open space, Re-use of defunct buildings, and decommissioning of infrastructure.[v] Slums along the river edges, hill tops and foot hills can be relocate by developing these brownfield existing sites in the city, this will help city to adapt future growth in terms of population.

VIII. Conclusion

These hillside developments are acting as an emulsion in process of natural ecology. The biodiversity of hills and in order to function its process there should be control over man-made intervention.

The principles those are invaded in this process are lagging behind, such as forest regeneration because of losing soil character, all the issues caused by human driving forces.

These principles are making a huge impact on the natural bodies.

Fragmentation and disintegration of the natural landscape, as well as the uncertainty of their retaining back, has made a divide in the urban environment. The city with its well-developed system of land use and mobility connects to an interwoven landscape of the city and that needs to be preserved. The city which has historically double focus is the science of the city to steer the transformation within the city.[viii]

These hills are part of cities open spaces which cater to public interaction in a natural environment. The scenic beauty caters to economy and prosperity of regional area of a city and therefore these sensitive bodies need to conserve and at the same time to be preserved. To increase natural land cover one needs to be responsible enough towards this natural monologues.

At this point of time, these hills are acting as a lost space in the city, thereby indulging them with the natural soft cape will create a greater resilience within the city form so that the sense of place can be seen in these hills and their environment.

The city needs a series of the Natural open space network which inherently dedicates itself to the sustainable development.

These hills are not just naturally significant but also a historically significant landmark of the city where one can perceive the city as a perceiving sense and the importance of their significance can be extracted by creating awareness within the city dwellers.

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