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About Cover Page

Shivani Goud | 8th sem

A detour to the Green Urban grid

The illustration is a mirror of the warmth of being in the lush greens in conjunction with the daily wilds of concrete. It goes hand in hand with sustainability by creating green pockets, interactive public spaces and other communal engagement spaces.

कल्पA

Volume 03 2022

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Bengaluru - 560109

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Go Change The World

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VISION

An architecture institute par excellence, nurturing academics, profession and research for a sustainable contemporary society.

MISSION

- To produce a class of professionals with creative thinking and questioning attitude towards appropriate architecture.
- To be a Centre of excellence for architectural and urban design studies by bringing the best teaching talent, infrastructure and technologies together.
- To be a crucible for promoting research activities in thrust areas of architecture and allied disciplines for societal benefits.
- To share the benefit of intellectual and professional capabilities with society by establishing institutional consultancy.
- To assimilate latest academic developments, pedagogy and learning through international exchange programmes.

PUBLICATIONS

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Board of Editors

Foreword - From the Editor-in-Chief

Each edition of 'Kalpa' revolves around a specific issue that concerns the profession and discipline of architecture and most importantly, the society. This edition of 'Kalpa' focuses on two very critically important agendas of the Sustainable Development Goals namely; SDG 9 and SDG 11. The contemporary cities and towns must be designed to adapt themselves to fast changing social, economical and environmental scenarios and thus the resilient human habitat is the focus of the SDG 9. The agenda provides ample clarity on the role of the architects, urban designer and planners can play in realisation of this goal. The SDG 11 focuses on making the urban settlements sustainable. Today the society is sharply divided between haves and have-nots. Today's cities need to be inclusive, safe and sustainable. The policies and actions of governments and professionals must reflect their commitment towards a just and equitable society. All appreciation to the editorial team of 'Kalpa' for taking up a theme of extreme social relevance and compliments to all authors on having made this as a focus area of their research and writings.

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Kalpa, a brainchild of RVCA academicians, engulfs itself on the culture of research to inculcate its ideologies in architecture and related fields. Architecture being a very subjective programme, gives rise to an investigative feature that lets us explore the complex peripheral streams informing design. This feature led to the formation of the research cell to infuse the philosophy of systematic study driven by context.

The inspiration for the word 'Kalpa' lies in its ritualistic approach that endures significant cycles of learning, revolving around the processes of creation, dissolution and recreation. Kalpa evolves with five definitive wings that guide through Chandas (patterns), Shiksha (learning), Vyakarana (grammar of assembly), Nirukta (etymology) and Jyotisha v(timeline). When looked closely, these concepts constitute the essence of research.

The research cell was also ideated to include an archive at the institution level with an aim to inspire the student folk and drive their attention towards unearthing layers of concepts that get hidden or unnoticed in their design processes. The first issue of the magazine (2020) explored the 'Idea of Research in Architecture' through dialogues with the institution's faculty, framing informal yet in-depth perceptions on the complexity it (research) endures. The second issue (2021) dissected the concept of 'Human Migration: its sociocultural, ecological and economical impacts'. Both the issues were enriched with the contributions of students attempting a structured take on the themes.

We now present to you the third issue of Kalpa (2022), through the works of students of Architecture and planning (Undergraduate and Postgraduate) on the overarching theme of 'Urban Future or (Fantasy?)' as a critical elucidation to the United Nation's (UN) Sustainable Development Goal 11 (SDG 11) as a response to their agenda of Inclusive, Safe, Resilient and Sustainable urban environments. The contributions explore connotations in defining an ideal city in the milieu of complex political, sociocultural, environmental and economic transactions. There has been a conscious effort in encouraging critical arguments with UN SDG's associated goals such as SDGs five, nine, ten, thirteen and sixteen, covering concepts of economic parity, gender equality, social innovation, climate change to name a few. This issue covers expert articles, student articles, student illustrations and expert interviews.

We hope to enrich the objectives of Kalpa further along thematic scales that question the nuances of the field and its peripherals. We acknowledge the immense support and encouragement of our Principal Dr. O P Bawane, our Dean Prof. Suresh Murthy and the faculty at RVCA. We also applaud the consistent efforts of our students in the success of this edition.

Hope you have a good read. Cheers!

Expert Editors' Note

Combating Together

According to the UN-Habitat world cities report of 2022, proliferation of the world's urban population can reach up to 68% by 2050 with most of them being concentrated in developing countries like India. Despite the urban issues caused during the pandemic which initiated major population decline in many cities of the country, the notion of the city often exhibits an inherent quality of drawing the population back. As we read, numerous cities are being designed and redesigned in the country to effectively accommodate and facilitate the available resources to all as part of city development. This ever-increasing population and their demand have further propelled the push for Indian cities to become more efficient, resilient, adaptive, and sustainable to combat unforeseen challenges. This issue of KALPA newsletter will reveal many such reflections of UN sustainable development goals and its broader thematic significance. The authors of this issue expand upon economic viability, social responsibility, urban voids, deepening inequalities, and the potential of sustainable development goals, its wider implications as a guiding framework for urban development. Understanding the nuances of these goals around and within the context of our country is a crucial step in building an ecosystem of inclusive communities and sustainable India.

Wishing them all the best for this issue!

Ar. Rashmi Pavagada Subbanarasimha
External editor
Research Scholar, IIITB

Editorial

“As an architect, you design for the present, with an awareness of the past, for a future which is essentially unknown.” - Norman Foster

This quote encompasses the ideas we aim to bring forward through Kalpa. The magazine, which is a research initiative by the faculty and students of RVCA, intends to highlight the nuances in architecture as time goes by.

The magazine’s third issue focuses to capture the role of architecture in promoting sustainable cities and communities of the future through an enquiry of the UNs Sustainable Development Goal 11. According to this goal, an ideal city should be inclusive, safe, resilient and sustainable. The ideas presented in this issue question, ponder, rethink and redefine the ideal city and our responsibility as architects to see it through.

While putting this edition together, we at the Kalpa Student Team were exposed to where the cities of today stand in terms of Urban Sustainability. We were also made aware of lessons we could learn from the past, and how they are regaining their relevance today.

We hope the reader too gains some insight into the intentions brought forward by the magazine and the importance of pausing, and looking back, in this world of rapidly growing cities, while we work towards a sustainable future.

Editorial team

Priyesha Anantharamakrishnan
Jahnavi Miriyala
Anisha Dara
Anish Perumal

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PART 1 :

Escaping the Concrete Jungle - Learnings from Cities and Towns

Illustration by : Shashank Manohar | 6th Sem

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How Traditional Knowledge Systems help in creating Sustainable and Resilient Communities: Lessons from the hilly Garhwal region for the world

Author : Dr. Janmejoy Gupta

Dr Janmejoy Gupta is an Architect-Urban Planner with 17 years of industrial and teaching experience. Presently he is Associate Professor and Dean, Research, Dept. of Architecture in School of Planning and Architecture, Vijayawada, India. His Research Areas are passive design strategies for thermal comfort in dwellings, energy efficiency in buildings and sustainability in urban planning. Dr Gupta is an Indian Green Building Council accredited professional and has worked on quite a few green building documentations. He has a total of 15 international journal publications and three book-chapters, which includes 06 SCOPUS indexed/Wed of Science Publications to his credit and is Reviewer for a few journals including Environmental Progress (Wiley Publications). He has written a book on Housing, Climate and Comfort, covering climate-responsive design principles which he would be presenting today.

Abstract :

The traditional knowledge system evolved from the experiences of communities. It has a mechanism to cater to socially, ecologically responsive, and disaster-resilient lifestyles. In harsh mountain ecosystems like Garhwal in Uttarakhand, the natural setting is extreme, livelihood resources are minimal, and they have an extra threat of constant disasters. In such cases, the traditional knowledge system is the key to live life better. The aim is to study and document the traditional knowledge system for Uttarakhand state (Garhwal region), develop an understanding of the various systems, evolve mechanisms to benefit the community and enable them to develop more resilient communities and cities utilising the lessons learnt from this study. The study also allows one to understand that traditions and culture have a significant impact on lifestyle and the built form.

Keywords :

Sustainable Communities, Settlements, Traditional Housing, Resilience

1. Introduction

Sustainable Cities and Communities are a need for the future of the continuation of human settlements. An ideal city, according to Sustainable Development Goal 11, should be inclusive, safe, resilient, and sustainable. However, while succumbing to the demands of wanton urbanisation, we should not ignore the cradles of our indigenous communities, whose timeless traditional knowledge systems in building resilient environments have stood the test of time and may give vital pointers towards building sustainable cities of the future. After all, sustainable communities lead to sustainable urban spaces. Importantly, traditional knowledge systems should never be ignored and have to be reinterpreted and used appropriately in the modern urban context for increased sustainability and resilience. The goals set by UN also reflect the same, as sustainable communities which showcase traditional knowledge systems have been given due importance through Inclusive Societies and Sustainable Cities and Communities [goal 16], International Economic Parity and Sustainable Cities and Communities [goal 10], Gender Equality and Sustainable Cities and Communities [goal 5], Innovation and Sustainable Cities and Communities [goal 9] and Climate Change and Sustainable Cities and Communities [goal 13]. All these indicate a clear intent to protect ecosystems and species that are central to our cultures that may disappear if the climate crisis is left unchecked. Here we discuss one such shining example in the form of mountain ecosystems in the Garhwal region in Uttarakhand.

The traditional knowledge system evolved from the experiences of communities. It has a mechanism to cater to socially, ecologically responsive, and disaster-resilient lifestyles. In harsh mountain ecosystems like Garhwal in Uttarakhand, the natural setting is extreme, livelihood resources are minimal, and they have an extra threat for constant disasters. In such cases, the traditional knowledge system is the key to live life better. The aim is to study and document the traditional knowledge system for Uttarakhand state (Garhwal region), develop an understanding of the various systems, evolve mechanisms to benefit the community and enable them to develop more resilient communities and cities utilising the lessons learnt from this study. The study also allows one to understand that traditions and culture have a significant impact on lifestyle and the built form.

2.1 Evolution of Settlements

Uttarakhand has a rich past in architecture. Communities developed their style of architecture using locally available materials. Both the Garhwal and Kumaon region have their own set of traditional wisdom of building construction. The following study covers evolution, types of settlements, different techniques and the style used in the Garhwal region for construction.

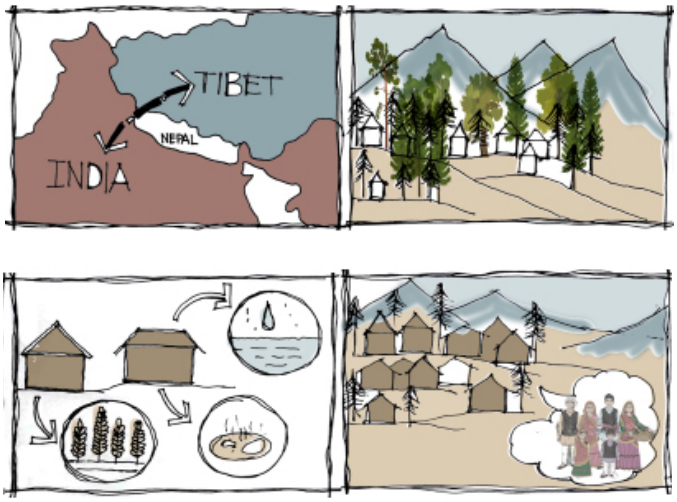


Figure 1: Evolution of settlements

The initial settlements came in the higher region of Uttarkashi valley due to the old Indo-Tibetan route. The communities believe that the majority of the settlements were not permanent. Many temporary settlements slowly turned permanent as the communities started inviting their friends and relatives. These practices are passed down through generations by oral traditions in the villages during festivals through folktales and folk songs. (Routela, 2015)

2.2 Types of Settlements

Due to the difference in geography, different types of settlements have evolved depending upon the location. These settlements can be categorised into four types- valley, hill top, spur, and gap. Local communities have developed their response towards site planning as per the existing conditions. The following tables 2 and 3 describe the features of each typology. (Rawat, 2019)

3. Styles of Architecture in the Garhwal region

3.1 An overview

In the Garhwal region, the houses in this region are placed after careful site selection in the areas which provide protection from the cold winds in winter. The traditional houses are built along contours of the hills and are generally of two or three floors, having a rectangular plan. It is observed that buildings in the Kumaon region are more elaborate and detailed than Garhwal architecture (S. K. Negi, 2017) . The detailed study of Garhwal region architecture is discussed as following:

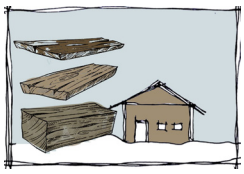
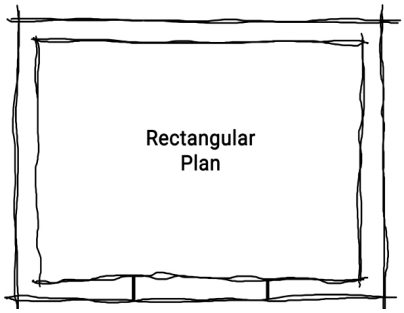
1	Soil Testing: The locals examine the soil and then consult the priest regarding the site's good or bad aspects.	 *Figure 10 Site Selection & Soil Testing (source: author)*
2	Small Doors and Windows: Old houses have some characteristics which protect them from extreme weather conditions. Most of the houses in this region have one or two small windows.	 *Figure 11 Small doors and Windows (source: author)*
3	Extensive use of timber: Timber is found in abundance. Villagers believe that wooden houses are best suited according to the geographical conditions of this place.	 *Figure 12 Extensive use of timber (Source: author)*

Table 4 Common Characteristics of Traditional Housing (Source: Author)

3.2 Koti Banal Style of Construction

Despite being a part of a seismically vulnerable region, Garhwal shows an elaborate earthquake-safe construction style called Koti Banal architecture. The local communities have practiced this style for the past 1000 years. Koti Banal is a village near Yamuna valley in the Uttarkashi district with its own set of building features. (Piyoosh Rautela, 2008) The salient features of this technique include a raised platform, simple symmetrical plan, and properly aligned walls.



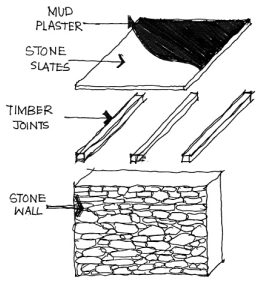


Figure 13 : Rectangular plan (source: author)
Figure 14 : Construction

3.3 Garhwali Stone Construction

The geometry of these houses is rectangular and straightforward, which provides stability and makes it less disaster-prone. Thick masonry walls are made from stone and timber. The sloping roof is constructed with locally available slate tiles. It is covered with mud plaster and placed above the timber beams. (S. K. Negi, 2017)

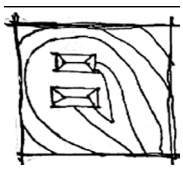
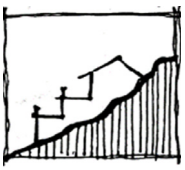
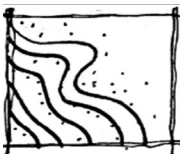
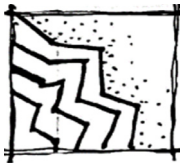
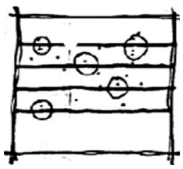
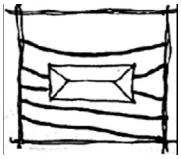
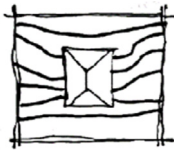
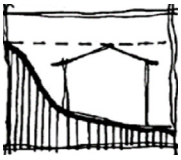
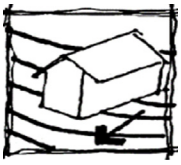
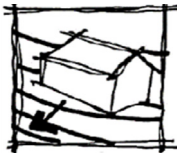
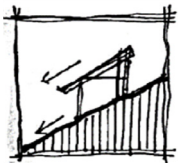
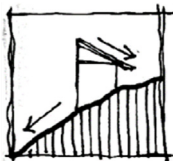
No.	DO		DO NOT	
1	Structures should minimise the grading and preserve the natural features		Constructing the building by destroying the natural slope and landscapes	
2	Terraced decks minimise the visual bulk		Overhanging makes building look more massive	
3	Grading angle should be gradually transitioned to the angle of the natural slope		Steeper slopes with an angular profile should be avoided	
4	Trees and shrubs in concave areas are preferred		Avoid uniform coverage of trees	
5	Building parallel to the natural contour		Buildings perpendicular to the natural contour	
6	Vertical structures should be below the ridge elevation		Structures with massive form and height destroy the silhouettes of hill	
7	Gable end perpendicular to the direction of the downhill side		Gable ends of the house on the downhill side	
8	The angle of roof slope should be parallel to the slope		The angle of roof opposite in direction with a slope of contour	

Table 1: Design Guidelines for a sloping site (Source of table as well as sketches: author)

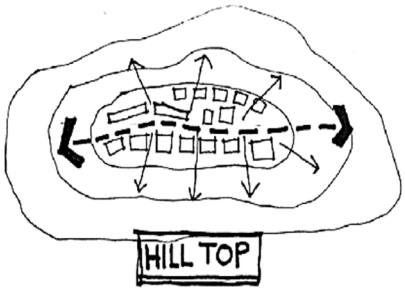
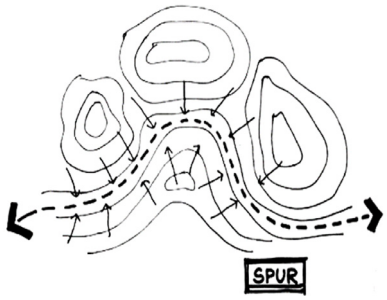
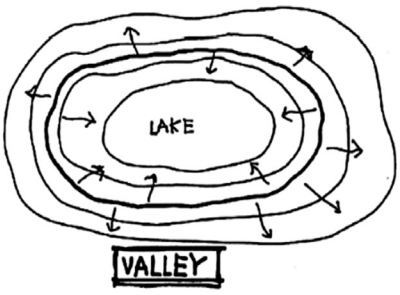
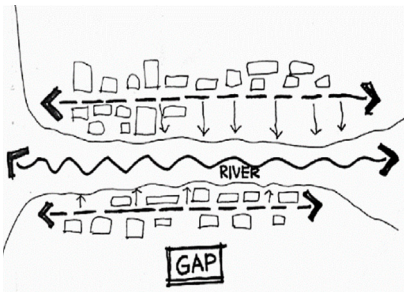
	Site Planning Approach	
Hilltop	They spread along the central functional axis, which is parallel to the contour and ridge. They spread from the central axis outwards.	 *Figure 2: top settlement pottern (source: author)*
Spur	Spur settlements grow inwards. They spread towards the major axis or major road.	 *Figure 3: Spur settlement pattern (source: author)*
Valley	They spread in outwards direction, from major axis towards up and down areas of the valley.	 *Figure 4: Valley Settlement pattern (source: author)*
Gap	These settlement types have the least scope for spreading and are divided into 2-3 parts due to river or stream. The structures are built along the linear axis parallel to the edge of the river.	 *Figure 5: Gap settlement pattern (source: author)*

Table 2: Site planning of different settlement types (Source: Author)

Valley	Location: 	Pros: Centrality, adequate space for physical expansion, easy accessibility of water, ease for transportation and utility services network Cons: The presence of a river system or water body and its catchment	 *Figure 6 Thalisain Village in Pouri Garhwal (Source: Google earth)*
Hilltop	Location: 	Pros: Healthy climate, scenic beauty, strategic position, and free drainage Cons: Virtual absence of flat land and lack of water supply	 *Figure 7 Narendra Nagar in Tehri Garhwal (Source: Google earth)*
Spur	Location: 	Pros: Transition between valley floors and hilltops, Natural defence, panoramic landscapes, moderate climate, and limited loss to the agricultural fields Cons: Restricted accessibility, frequent landslides, and limited scope for expansion	 *Figure 8 Pauri town in Pauri Garhwal Source: Google earth)*
Gap	Location: 	Pros: Coverage of routes, transition points, water availability Cons: Limited scope for expansion	 *Figure 9 Devaprayog in Tehri Garhwal (Source: Google earth)*

Table 3: Types of settlements (source: (Rawat, 2019)

3.4 Salient structural features of Koti Banal architecture:

- Load Resisting System: The masonry used for construction is dry rubble masonry. The live load and dead load get distributed from roof to wooden structural logs to the dry masonry walls, and the wall transfers the load to the strong stone foundation avoiding damage during earthquakes. (Joshi, 2008)
- Good aspect ratio (1:1.5) of building: This is in-line with building code requirements, which state that the structure should have a simple rectangular plan layout and be symmetrical in terms of mass and rigidity. (Joshi, 2008)
- Timber reinforced stone wall with dry masonry: There are load sharing mechanisms in the 1.5 feet thick dry masonry wall. In wall construction, wooden beams are installed from above which improves the structure's seismic resistance. (Joshi, 2008)
- Massive solid platform: It is located at the structure's base and aids in keeping the structure's centre of gravity and centre of mass close to the ground. In the higher stories, lighter materials are used. (Joshi, 2008)
- Use wooden beams for structural support: The building's beams are usually rectangular and 20cm to 30cm thick. These wooden beams have sections that are larger than required for safety. Minimal angular displacement is possible as a result of this. (Joshi, 2008)

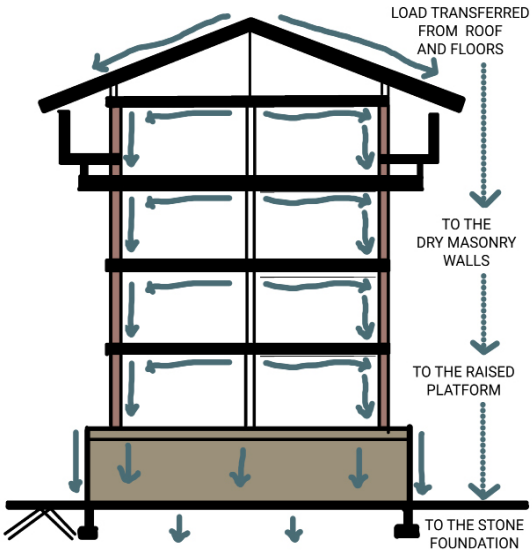


Figure 15 Load transfer mechanism (source: author)

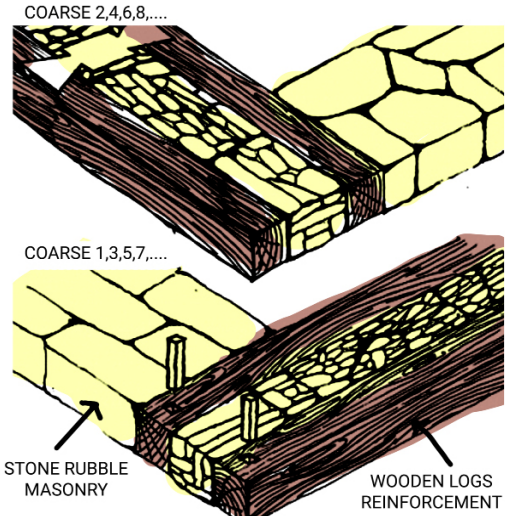


Figure 16 wall masonry detail (source: author)

3.5 Socio-Economic Aspects

Generally, one family occupies one housing unit. Due to the succession of family, nowadays, different floors are allocated for different children. During the day, a maximum of five members are present in the house, and in the evening, five to ten members are present. In most houses, the ground floor is used for cattle, and the upper floors are used as living and kitchen spaces. The traditional houses have three kinds of spaces- open, semi-open, and closed. The spaces formed due to a cluster of two-three adjacent houses act as a private shared gathering space.

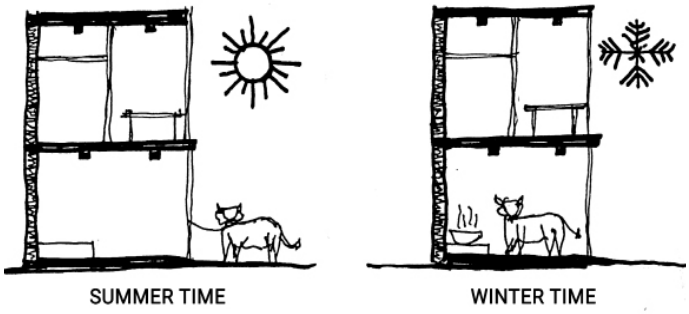


Figure 17 : Different Use of ground floor in different season (Source: author)

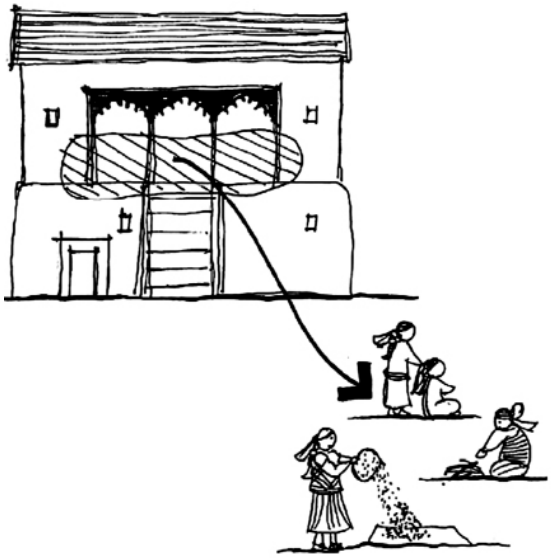


Figure 18 : Use of central open space (souce: author)

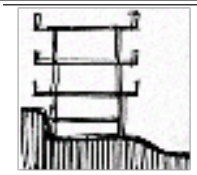
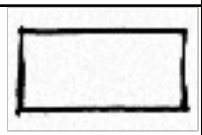
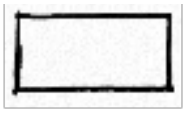
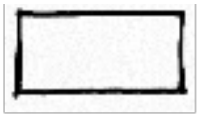
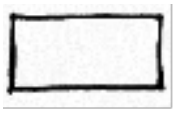
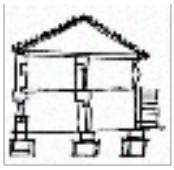
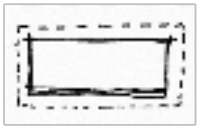
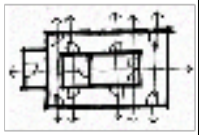
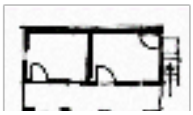
	Traditional Architecture		Contemporary Architecture		Inference
House	Residence in Mussorie	Panwar Residence	Pant Residence	Residence in Tilod	
Year & Location	1810, Mussorie	1700s, Uttarkashi	1998, Uttarkashi	1995, Uttarkashi	
Site	 *Figure 19* *Source: author*	 *Figure 20* *Source: author*	 *Figure 21* *Source: author*	 *Figure 22* *Source: author*	Traditional houses have stable sites
Plan	 *Figure 23* *Source: author*	 *Figure 24* *Source: author*	 *Figure 25* *Source: author*	 *Figure 26* *Source: author*	The geometry in traditional houses is symmetrical in both cases
Projections	 *Figure 27* *Source: author*	 *Figure 28* *Source: author*	 *Figure 29* *Source: author*	 *Figure 30* *Source: author*	More robust joinery in traditional houses and more articulated.
Openings	 *Figure 31* *(Rawat, 2019)*	 *Figure 19* *(Rawat, 2019)*	 *Figure 19* *(Rawat, 2019)*	 *Figure 19* *(Rawat, 2019)*	Openings are bigeer in modern houses without ornamentation

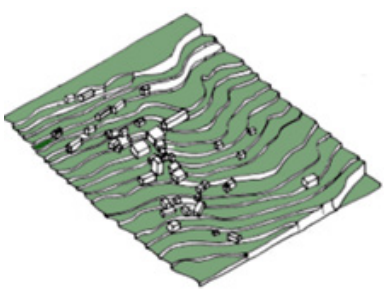
Table 5 Comparative analysis of Traditional and Modern villages in Uttarkashi district (source: (Rawat, 2019)

4. Case studies

4.1 Case study 1: Koti Banal Village

Location: Near Barkot, Rajgarhi, and Uttarkashi. Area: 1.1 sq. km.

Koti banal village is one of the most famous villages in the district. It has no proper connectivity to the main road. The settlement is connected with different small public spaces formed organically in the checks. These public spaces act as a gathering space and hold different festival activities. The houses are oriented to the north direction, hence the open spaces between them get ample sunlight, and daily household activities can be quickly done there. The wooden houses in this village are majorly 2 to 3 storied. The ground floor is allocated for cattle, and the family occupies the upper floors. (Planning)



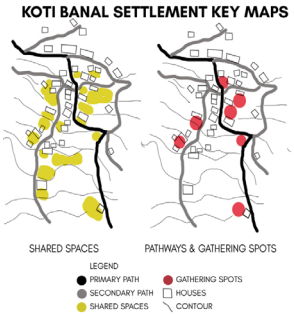
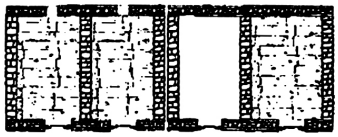


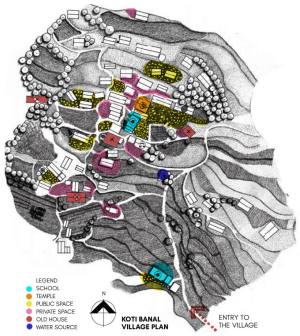
Figure 35 : Site contours and settlement (source: (Planning))
Figure 36 : movement and open space (source: CITATION Uni \l 1033 (Planning))

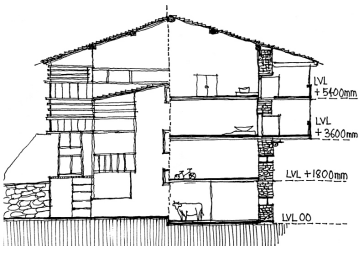
4.2 Case study 2 : Sonara Village

Location: Rajgarhi,Uttarkashi.

Sonora is a small village with a total area of 113.7 hectares and a population of 334 people. Stone and wood construction is found in the village. In this typology, the ground floor is constructed using stone, and the thickness of each wall is 500 mm. The structure is load-bearing. For constructing the first floor, interlocking rods of wood are used with stone to make the upper structure lighter. This technique centralises the centre of gravity and hence makes the structure earthquake resilient.







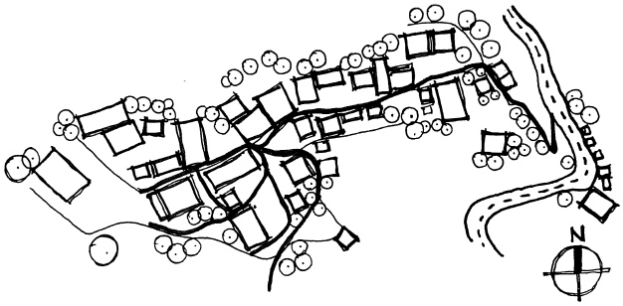
Clockwise
Figure 37 : Ground Floor plan of house (source: (Planning))
Figure 38 : Site plan of Sonara Village (source: (Planning))
Figure 39 : Sectional Elevation of House in Sonara village (source: (Planning))
Figure 40 : Site plan of Koti banal village source: CITATION Uni \l 1033

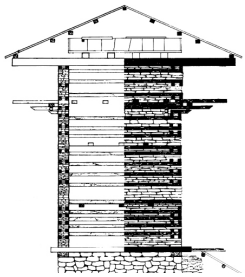
Granaries and structural members are made purely with the Deodar wood only. Random rubble masonry was used in the construction of the wall. This village has rocky terrain; hence, the houses do not require any foundation underground.

4.3 Case study 3: Gona Village

Location: Rajgarhi, Uttarkashi

Gona village has an area of 127.53 hectares with a population of 383 people. Wood and stone are used for construction. In this village, the houses are taller to concentrate the mass to a smaller area. The ground floor is locally known as Goshal or Goth, a space dedicated to cattle and storage. This floor has no formal/defined entrance. Ventilators are used instead of the window to provide insulation. The flooring is coated with cow dung. Sometimes, this space is also used for cooking. The construction is simple and symmetrical; strong interlocking wooden members are joined at the corners. The structure has flexibility as it has no mortar. The thickness of the wall decreases on the upper floors. The building rises to 13 m above the ground with a pitched roof.





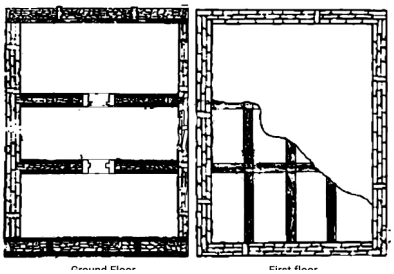


Figure 41 : Site plan of settlement of Gona village
Figure 42 : Section and elevation detail
Figure 43 : Ground and 1st floor plan of house (source: (Planning))

4.4 Case study 4: Khirsu Village

Khirsu is a small village of a population of approximately 1000 people located in Pauri Garhwal district in the Garhwal region. It is placed at an altitude of 1700m. A total of 245 families live here. Farming is the primary source of livelihood of the village. Hence the daily activities are either household or agriculture-related. The spaces built based on traditional knowledge help them perform their daily chores. The open spaces get uniform sunlight due to the north orientation of the building. The following visual explains the traditional house form and activities around the same. (Compartment S4)

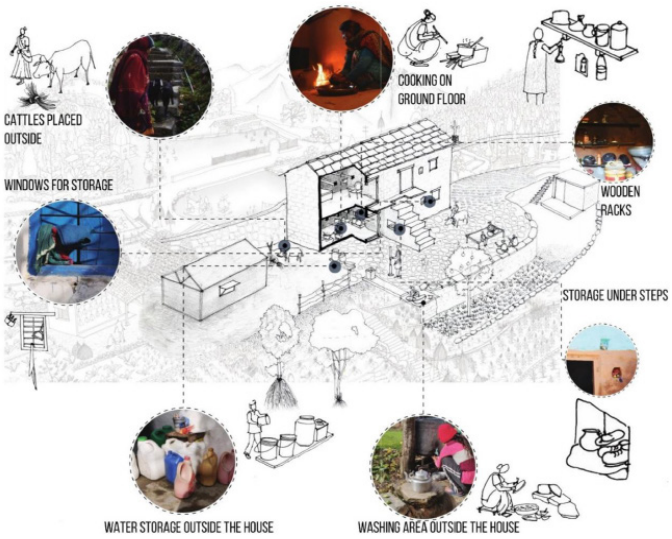


Figure 44 : House form and activities around it (source: (Compartment S4))

5. Conclusion

The modern construction style needs to become more sustainable and disaster resilient. Hence, the wrath of natural hazards has increased in recent years. So there is a lot to learn from traditional knowledge systems like that of Garhwal region, which has its own set of cultures, and construction styles.

The above study shows that the traditional knowledge systems have had a major impact on the built environment. The whole study started from macro-level planning and gradually proceeded to micro-level planning. Macro-level planning includes the process of selecting the site, developing and arranging the built form which will respond to the natural landscape. Traditional wisdom was used to develop the built form considering the needs of open, semi-open and closed spaces. Micro-level planning includes the selection of materials, disaster resilience, climatic response, structural stability, aesthetical value and the use of small spaces for different purposes.

Traditional knowledge has sustained many settlements as well as protected lives from disasters. It can be concluded from this study that our traditional wisdom can provide sustainable solutions in the present context. These can be studied more in order to further similar research. This study has been done based on secondary sources including DMMC reports, research papers and government reports. Considering the scope of traditional knowledge systems in the Garhwal region, there is a major scope to find out numerous unidentified styles of construction methods and disaster resilience strategies.

The study highlights the important role of appropriate design based on respecting nature and utilising context appropriate traditional wisdom play in the volatile circumstances existing today, wherein ecosystems and species that are central to our cultures are at the risk of disappearing altogether in the wake of climate change and other associated perils. It is high time we gather together the lessons from these resilient, surviving communities and interpret them appropriately in our quest to build sustainable cities of the future.

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Illustration by : Shivani Goud | 8th sem

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Modeling and Forecasting Sites for Affordable Housing in New York City to Meet Local Need

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Abstract :
Affordable housing is a pressing concern in New York City and the city must focus resources to best meet local needs. This study tests several models for the locations that have gained affordable housing under the Housing New York plan and the number of units at each location, based on the parcel attributes and neighborhood demographics. A random forest classifier and regressor are shown to slightly outperform, respectively, a logistic regression and a generalized linear model. The best-performing models are used to forecast sites of future affordable housing and the number of units expected at each parcel if it were developed as affordable housing. These forecasts are compared to localized need for housing, measured by 311 inquiries. These models can aid the city in focusing resources on neighborhoods with the greatest housing need and projecting the scale of affordable development at particular locations.

Keywords :
Affordable Housing, Housing Development, Neighborhood, Demographics

Introduction

Affordable housing is a pressing and increasingly urgent concern in New York City. For years, the New YorkCity Department of Housing Preservation and Development (HPD) has redeveloped thousands of vacant lots that were transferred to its possession during the 1970s and early 1980s. Despite these efforts, according to the NYC Department of City Planning there has been about a 7.5 % increase in new housing units since 2010 . With the supply of HPD -owned land mostly depleted, the City must utilize other government-owned land to maximize housing opportunities for New York households in need of affordable housing.

In New York City and across the country, cities are turning to underutilized real estate to create affordable housing. With the reduction of travel for leisure and for work, the Covid-19 pandemic created a new inventory for reconstruction, hotels, office buildings, and garages that are up for sale. In addition to these spaces, there are school campuses with extra land, police precincts and libraries that could be reconstructed as opportunities for new affordable housing and upgraded public amenities. There is a growing need for housing units for the homeless, extremely low-income, and low income individuals and it is unclear if existing programs can match the demand.

This project studied the locations of affordable homes created or preserved under New York City's Housing New York program. We model the locations of sites and number of units based on parcel-level attributes and neighborhood demographics. We use these models to forecast. where additional housing is likely under existing City programs and policies. We then compare the forecast with local indicators of the need for affordable housing. These models can inform City decisions about areas where more housing is needed and specific plans for individual sites.

Data

We used several open data sources for this analysis, including PLUTO data on all New York City properties, U.S. Census data for neighborhood demographics, records of Housing New York properties, and 311 inquiries regarding affordable housing. Details on our data sources are included in Appendix A .

Our data consisted of several categorical variables (e.g. building class, zoning), which were converted into dummy columns. The result was a wide data set with 419 total features.

For classification tasks (detailed below), which considered every parcel, we used 213-vintage data to fit models, then used the newest PLUTO records (from 2021) and newest reliable data Census ACS data (from 2019) to forecast future development.
For regression of the number of units, which was trained only on parcels that have actual Housing New York units, we compiled PLUTO and ACS data specifically for the year before each project was started and used this for training. For forecasts, we used the same most current PLUTO and ACS data.

Methods

Classification

The first task we pursued was to build a model of the parcels which would have Housing New York affordable housing units, based on the unique parcel and building factors as well as the demographics of the surrounding neighborhoods. We employed several classification models for this task, training each on a subset of the data and testing on withheld training data to compare model performance.

Logistic Regression

We created a baseline classification model using Logistic Regression. To adjust for imbalanced data (a challenge detailed below), in this baseline model, we undersampled the overrepresented class to remove the imbalance and then used this data set to train and test our model. Results for our baseline model are shown in Table 1 .
Because of the expected multicollinearity among features, we tested using principal components in the logistic regression. This model performed slightly better after using PCA , but the improvement was not good enough to offset the loss of interpretability of features. So we ended up discarding that particular approach. Results for the logistic regression model using PCA are shown in Table 1 .

Evaluation Metrics	Without PCA	With PCA
Average Precision	0.79	0.84
Average Recall	0.79	0.84
Average F-1 Score	0.79	0.84

Table 1 : Performance o f logistic regression classification

Random Forest

We additionally employed a random forest classification and decision tree to model whether parcels would have affordable housing units. This decision tree used 26 features with the cutoff point selected to minimize the variance or Gini index of the classes. This model selected as trend features floor area ratio and total Black population, but the model does not quantify which is more important (the first and second splits were also performed b y the trend features). The importance of a feature can be computed by checking all the splits in which the feature was used and how much it has reduced the Gini index compared to the original node. Based on this method, the two most important features here are total Black population and median income (see Figure 1).

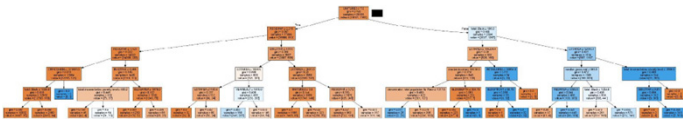

Figure 1 : Decision tree model

The recall performance of random forest classification was 0.89 and that of the decision tree was 0.88 , making random forest the best model amongst the classifiers we tested. Usually, a tree based model is used where features and outcomes are non-linear and/or where features interact with each other. We used the tree based model to check how the features in our model interact with each other. However, it is possible that in our model some features may b e completely independent of each other.

Handling imbalanced data

In the classification problem we faced a challenge of imbalanced data. Our data exploration identified a large imbalance in the data between the parcels that do have Housing New York units (n = 3,655) and those that do not (n= 671,026). We tested different ways to handle this imbalance.

The problem with training our model using the original imbalanced data is that when the count of a certain class overwhelms another class, the classifier may be biased toward that class. For example, imagine that we have a very "stupid" classifier that predicts no affordable housing on every parcel. Since the data is so imbalanced, this classifier will have a very high accuracy, as shown below.

$$Accuracy = \frac{\#\ parcels\ correctly\ predicted}{\#\ parcels\ in\ New\ York\ City} = \frac{671{,}026}{(671{,}026+3{,}655)} = 99.46\%$$

Optimizing accuracy would miss the purpose of this task, predicting parcels that would have affordable housing. We instead measured performance on recall, or the portion of positive labels that are correctly predicted.
We tested two approaches for balancing the training data set: undersampling the majority class and oversampling the minority class to have perfectly balanced data (i.e., same size for both label classes).

Testing levels of undersampling

To test whether the model could retain a reasonable level of recall performance while using more of the true negative samples, we fit and tested the model at 10 different sample sizes, ranging from a sample of the true negatives equal to the number of true

positives, up to the complete data of true negatives. The recall dropped rapidly a s the sample size increased, falling below 50 percent when the true negatives numbered ten times the true positives (see Figure 2). This recall value can be compared to the baseline ratio of the portion of true positives in the full data, which is just 0.5 percent, and by this formal measure the model performs above baseline. However, making correct predictions of a parcel status less than 50 percent of the time is insufficient for the intended purpose of predicting future housing production.

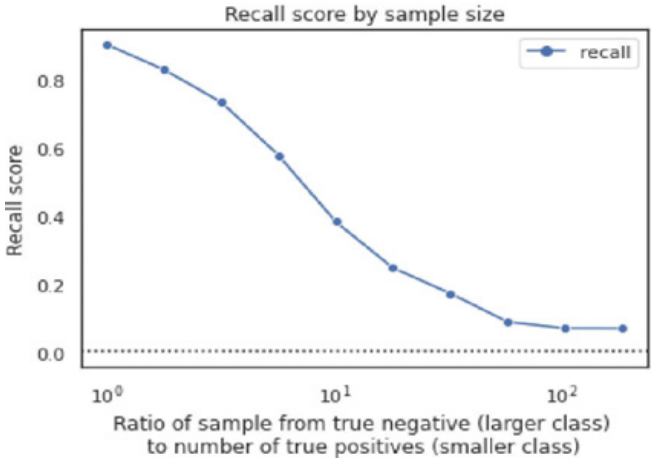

Figure 2 : Recall score a t different sampling levels. X-axis measures the ratio o f the size o f the sample o f true negative values (the larger class) to the number o f true positive values (the smaller class) (Log scale)

Using undersampling, we were limited to a very small sample of the data. We resolved bias problems, but leaving out so many data points comes with the risk of losing important relevant information for the prediction.

Oversampling the smaller class

As an alternative approach, we also oversampled the minority class by "creating" new parcels that are affected by affordable housing. Even though we are preventing any information loss, there could be overfitting on the duplicated data points from the original undersampled class. To solve this problem, we could create synthetic data points that are similar to the ones in the undersampled class using the SMOTE technique.1 Table 2 shows the recall scores for three different models: Logistic Regression, Decision Tree, and Random Forest using both plain undersampling of the majority class and oversampling of the minority class by using SMOTE.

	Logistic Reg	Decision Tree	Random Forest
Undersam-pling larger class	0.8522	0.8892	0.8950
Oversampling smaller class (SMOTE)	0.8536	0.9371	0.8696
Difference	+0.2%	+5.1%	-2.8%

Table 2 : Performance o f classification models (recall score) with differing o n sampling strategies

The table highlights the possible gains in performance by using SMOTE. In particular, logistic regression showed slightly better performance when using SMOTE, but only in some instances (the random process yields slightly different results on different instances). The Decision Tree classifier has a 5.1% higher recall score by using SMOTE instead of the undersampling of the majority class. However, with the random forest classifier, SMOTE performed worse than undersampling, decreasing recall from 0.90 recall to 0.87.

After testing SMOTE oversampling independently, we used GridSearchCV to find the best combination of parameters across all six models. The best performance was shown on Decision Tree with SMOTE, with a recall score of 0 .9 4 . The best parameters found were: {'max_depth':2 , 'max_leaf_n o des':20}. This best model was used for later forecasting.

Regression

Our second main task was to fit a regression model for the number of affordable housing units on parcels that are Housing New York properties. Housing New York encompasses a variety of different building types at different scales, so the number of affordable units on a parcel which falls under this program varies widely. It is important to build a model for the number of units to understand which parcel and neighborhood factors influence the scale of a project and forecast the likely size of a project at a given location.

To train the regression model we used the actual number of units on Housing New York parcels as the outcome and the parcel and Census Tract features from the year before the Housing New York project was started as predictors. We trained the model on a subsample of the data and then tested model performance out-of-sample.

Poisson Regression

We fit a Generalized Linear Model with a Poisson regression model (to match the discrete numbers of units and the distribution of units, with most parcels having few units and a smaller number of parcels with large numbers of units (see Figure 3a). Each column was standardized. Because of the multicollinearity between features, regularization was needed when fitting the model. By testing on a validation subsample of the training data, we found an α of 372 to produce the best fit. This model had out-of-sample D2 of 0.642.

Principal components

To handle the potential multicollinearity and compress the data, we further tested regression based on principal component analysis. Evaluation of the explained variance added by each successive principal component revealed we would still need many dimensions for an adequate regression model. Both linear and Poisson models were fitted using principal components. Figure 3 shows how the Poisson model D 2 score improves with the number of components included, but plateaus just below 0.60 .

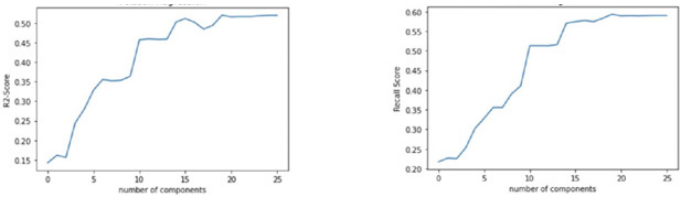

Figure 3 : (a) Model Performance vs Number of Components for Poisson Regression (R2 Score) (b) Model Performance vs Number of Components for Poisson Regression (D2 Score)

Random forest regression

We further fit a random forest regression to predict the unit count. This model used the same features as the generalized linear model. The optimizing criterion was the reduction in Poisson deviance, to match the criterion used on the generalized linear model. The model was fit with expansive parameters (no minimum depth, minimum samples to split = 2, minimum samples at leaf = 1). This model performed slightly better in explained deviance than the generalized linear model, with a D 2 score o f 0.686. Table 3 compares model performance.

Model	D^2 score
Generalized Linear Model	0.642
With PCA	0.593
Random Forest	0.686

Overall, performance of the regression models was only mediocre. It may be that, with just a few thousand actual projects to model from there were insufficient samples and the models were
undertrained.

Because of this, we determined it would not be feasible to further segment the data to regress for the numbers of units of particular types, sizes, or classes. Nonetheless, with our best model accounting for two-thirds o f the possible variation in the total number of units, we proceeded with a forecast for the number of units.

Forecast from 2021 data through classification and regression models

After finding optimal models on past data (and determining that these models performed reasonably well), we used the best-performing models for forecasts. We input current data for each feature, for each parcel, to forecast which parcels were likely to have Housing New York units and how many units would be likely on each parcel if that parcel were developed as affordable housing.

The predicted parcels were mapped to show which areas had more candidate parcels for affordable housing and the spatial distribution of the number of parcels. A kernel-density estimator ("heat map") was plotted to show the spatial concentration of parcels classified as likely to host affordable housing (see Figure 4).

Forecast unit counts were also mapped and are shown to b e quite heterogeneo us, even at small scale. These fine-grained differences can be important for decision support.

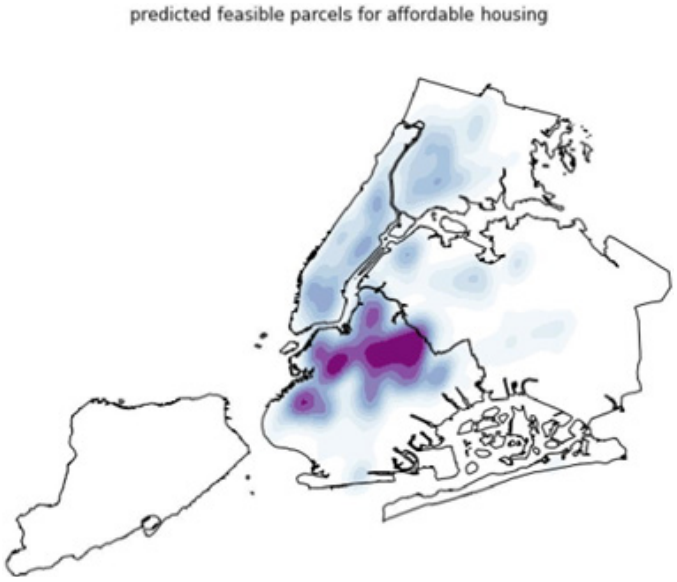

Figure 4 : Density of parcels forecast to have affordable housing

Measuring supply vs. demand

We used 311 inquiries about affordable housing as a measure of local need for housing. To compare forecast supply and demand, we summed both 311 requests and parcels by ZIP code areas, standardized each count (i.e., computed standard deviations from the mean for each value for each area), and took the difference in standardized values. Areas with positive values have a greater-than-typical number of inquiries for affordable housing compared to the number of local parcels forecast to be suitable for affordable housing. average, than their portion o f 311 inquiries would recommend (See Figure 6).

Discussion

Our classification forecast shows which parcels are likely to be developed as affordable housing, based on the parcel and building attributes and neighborhood characteristics. Because our classification models were trained on artificially balanced data, they projected these balanced proportions onto the forecast data. Our classifier forecast 192,664 parcels as more likely to be developed as affordable housing. This is an unrealistic total number of projects (considering fewer than 4,000 have been developed in the past eight years), but the locations and concentrations of these parcels are meaningful. We interpret the neighborhoods that have many parcels marked as likely for affordable housing to be those with more suitable sites for development. It is notable that even under a hypothetical scenario where nearly one-quarter of properties in the City would be developed, very few sites on Staten Island or eastern Queens would likely gain affordable housing (see Figure 4).

We find a large degree o f alignment between the likely locations for affordable housing and the areas with the greatest demand (expressed through 311 inquiries) (see Figure 5).

However there are areas where local demand surpasses the proportional supply. This mismatch is particularly evident in East New York, southwest Queens, and the central Bronx (see Figure
6).

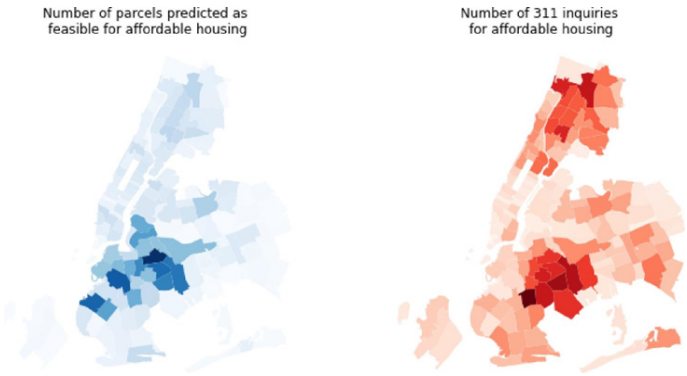

Figure 5 : (a) Number o f parcels forecast a s sites for affordable housing. (b) Number o f 3 1 1 inquiries for affordable housing. Counts summarized by ZIP code areas.

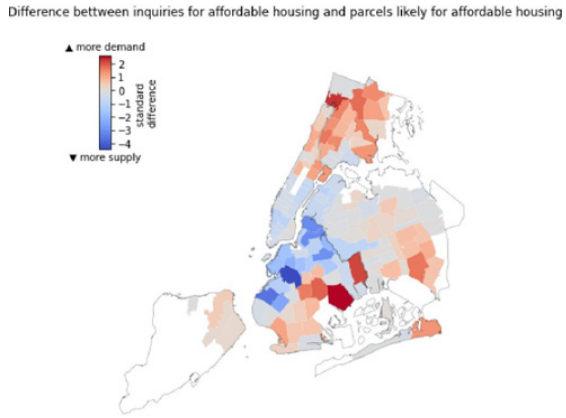

Figure 6: Difference between inquiries for affordable housing and number o f parcels forecast for affordable housing (differences in standard-

The difference between the inquiries and likely parcels for affordable housing align with the newly released Disparity Risk Index. These locations have an intermediate- to high risk for displacement and generally have a higher rent burden than the rest of the city.

The parcel-specific forecast of the number of expected units if a parcel were to be developed shows overall patterns but also high local variability (see Figure 7). Further spatial analytic tools could determine the exact spatial structure of these data.

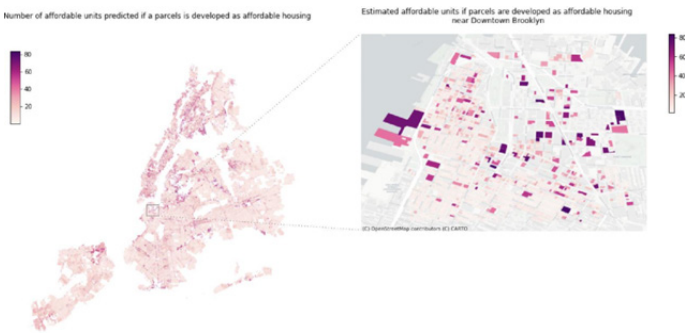

Figure 7 : Number of units forecast per parcel if that parcel is developed a s new affordable
housing. (a) citywide, (b) highlight of the area near Downtown Brooklyn.

https://equitableexplorer.planning.nyc.gov/about

Conclusion: to ward a decision support tool

The forecasts of likely locations for affordable housing development and parcel-level predictions of the expected number of units can aid the City in planning affordable housing sites. The difference between forecast number of suitable parcels and expressed need show which neighborhoods may need extra focus to find more sites for affordable housing.

Residents in the neighborhoods we identify with a housing deficit are also at a higher risk of displacement. In order for households in these neighborhoods not to be displaced in the years ahead, the City will need to utilize government-owned land and repurpo se underutilized property to maximize housing opportunities. With the limited availability of City owned land in these regions, the legislation before the State Assembly could further expand the landscape of options for affordable housing (i.e. the use of basements, garages, hotels, and office space for affordable housing).

These projects are capital intensive, To produce the current rate of housing preservation and new construction HPD expends over a billion dollars annually in capital. The FY2023 capital plan totals $1.43 billion. Under the 2023-2026 Four-Year Plan, HPD has 4 .3 billion to conduct preservation and new construction activities.3 This allocation will allow the agency to keep pace with previous years, but it will not result in increased production. As a result, there is an even greater need to optimize the total number of units that can be produced. This will help to prioritize where new affordable housing development request for proposals (RFPs) should be issued.

The predicted number of units indicates the likely scale of a project a t any given location. This parameterized model could be used for ‘ what-if’ and optimization scenarios, e.g. considering how rezoning a parcel or combining or splitting parcels to change the developable size would affect the likely number of units.

Illustration by : Shivani Goud | 8th sem

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Kalpa, Vol.03, 2022, pp. 20-22

From the Sentinels of Rumsu

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Mr. Ajinkya Kanitkar holds a Bachelor's degree in Architecture from Visvesvaraya National Institute of Technology, Nagpur (2010-15) and a Master's degree in Urban and Regional Planning from School of Planning and Architecture, Bhopal (2018-20). His professional experience between the years 2015 and 2017 includes working on various projects such as Industrial, Hospitals, Commercial, Residential, Interior and Space Design. He has handled these projects from pre-design to execution and completion stages. He has also worked as a lecturer (2017-18) at the department of Architecture NIT Hamirpur, Himachal Pradesh as Lecturer. Between the year 2020-21, he has contributed to a performance assessment system project for 30+ ULBs in Maharashtra.

Abstract :
The state of Himachal Pradesh has a vibrant mix of geolocations that gradually change from plains to rolling terrain to hills. The elevation ranges from 300 MSL to whoppingly high 6000+ MSL above Shivalik and Dhauladhar ranges. The moment the elevation of 1500 MSL is crossed, one can notice the change in the language of the natural and built environment. Beautiful façades of snowclad mountains cover the realities of extreme weather conditions and subsequent hardships. Yet for ages, people of the hills that thrive here have developed peculiar systems that help them sustain these unfavourable conditions. This article studies these systems used by the people of the Rumsu village.

Keywords :
Vernacular, Social Hierarchy, Natural Environment, Protection

Rumsu is situated in breathtakingly beautiful laps of Great Himalayan ranges at an approximate elevation of 2200 MSL in Kullu district near Naggar block. After crossing prominent landmarks at Naggar - Naggar castle and Tripura Sundari temple, one can reach the village by the motorable Pulag road. But if time and efforts are at one's disposal, one can always follow a serpentine trail starting just opposite the temple, navigating through wildflowers and turning around a few short storage sheds occasionally popping up as markers that guide the way to the terraced fields of Rumsu village.

The settlement is a Heritage site with mesmerising Kathkuni architecture forming residences, storage sheds, animal yards and religious structures. Availability of a constructible landmass is extremely limited in a hilly terrain, and snowfall, landslides along with frequent earthquakes make it even more difficult to find safe, habitable pockets. One can find structures popping up wherever the slopes mellow down a bit for construction. Thus, the structure of settlements in hills becomes heterogeneous. What gives it a definitive identity is the built-form called Kathkuni architecture. The construction technique of Kathkuni, developed over several centuries, is a true reflection of the ability of people to adapt to, and sustain through a challenging context.

These rich architectural specimens are constructed with locally available stone and timber. Granite stone platforms

Figure 1: Terraced fields at the entry of Rumsu village from trail

are constructed to level the floor along a slope on top of which a load bearing structure is constructed. Deodar (cedar) trees which are abundantly available here, become a source of monolithic timber joists spanning from 12ft to 16ft. With skills developed over the ages, the craftsmen, 'Thavu', build structures that can last thousands of years. Alternate courses of timber joists are interlocked with various timber joinery systems, some of which are unique to the hills. The gaps are infilled with flat granite slabs or slate slabs.

One of the intriguing facts about the construction process is

that the entire production happens piece-by-piece at a nearby construction site which is then collected and assembled stagewise on the actual site. The oldest of the specimens are constructed simply with timber joinery and are famous as 'nail-less' or 'glue (mortar) less' architecture. This structural system that counters dynamic loads during earthquakes in an excellent manner. These innate heavy structures behave in such a way that in case of an earthquake, the individual member vibrates at its place. They may sway or bend, but never collapse completely.

Traditionally, the entire process used to become an affair of the community where everyone helped in the assembly with their respective ability, and the tacit knowledge of construction used to be transferred from generation to generation. A fun fact is that the entire structures are dismantlable if needed, and the material of dilapidated structures can be salvaged for new structures. This is the biggest of the boons in a context like this. The technique responds well to the present ideas associated with the term sustainability.

Figure 2: Documented name of the head craftsman

Figure 3: Typical Kathkuni house-animal shed at base, living areas at the upper levels with cantilevered rooms

Another peculiar characteristic of the technique is that structures are constructed with a smaller base and wider upper floors by adding cantilevers. This allows for the construction of multistorey structures with a limited footprint. Usually, cattle and storage rooms are constructed at the ground level and the habitable spaces for people start from the first story onwards. The wall thickness, usually one and half feet and more, enables much desired insulation against harsh winters. By simply adding a layer of mud plaster or hay lining along with timber planks, protects the interiors from subzero temperatures outside. All one needs is a small stove called 'Bukhari' in the local language, that heats up the interior spaces.

Look and feel wise, complex timber joinery which itself ends up becoming a design element, along with intricate patterns and carvings over timber fascia, complement the rugged and robust stone and slate palette. Various typologies of structures which include residential single units, multistory units, palaces, religious structures like temples, shrines, storage sheds, animal yards, etc. have been constructed in Kathkuni.

There are usually three sub styles of Kathkuni architecture seen in the region viz., Pagoda style which is seen in temples as well as monumental structures, Pahadi style that is traditional cuboid type and widely used for all sorts of structures and Shikhara style which is mostly seen in temple architecture.

Figure 4: Old sacred tree and structure for 'Devta'

Figure 5: Local community god or 'Devta' temple

While interacting with the natives, one can easily sense the boundaries created by the locals, especially at remote locations like Rumsu. Historically, most of Himachal Pradesh is believed to be an unconquered territory up till the British started settling near Shimla or Dharamshala. Even then, the rest of the remote areas remained untouched. A local Himachali takes immense pride in this. Some even address themselves as truly 'free' Indians.

A former Pradhan (traditional elder leader) at Rumsu narrated an interesting story of untouchability. No outsider is generally allowed to enter the settlement or even touch the locals. Gestures like shaking hands or even touching during exchange of money if the visitor is buying anything there used to be prohibited. This 'touch me not' rule includes the structures too. The violation of this rule is taken very seriously even today in some settlements. If it is a local structure, the penalty includes a few hundred rupees but if it is an important religious structure or an old tree, the penalty can become as hefty as an actual feast to the entire settlement.

Other rules include not wearing leather near religious sites and spots, not burning campfires in the woods, not defecating near settlements, etc. which have other similar penalties associated. With a change in time and exposure to contemporary building materials, percolation of RCC, concrete and steel in newer structures is visible even here, which is highly questionable especially at such elevations. The Pradhan brought forth interesting insights of how the government policies affect building construction. One of the major reasons for divergence from vernacular building techniques was told to be the government policies. Traditionally, a God's wood of protected trees by the community was present where each family was allowed to cut a tree for repairs or expansion of their existing house once in 50-60 years against a promise to replace the fallen tree.

With later changes in regime and stringent implementation of laws, the concept of god's woods started vanishing away, affecting traditional supply of timber. A false narrative of 'permanent' or 'pukka' construction fooled the people into opting for alien construction techniques, until they realised the problems and inefficiencies of it especially in colder regions.

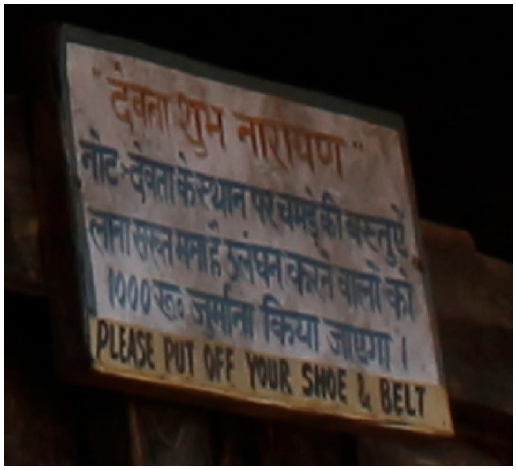

Figure 6: Warning signs of local rules

Figure 7: RCC framed structure vs. Kathkuni Structure

Himachal Pradesh is famously known as 'Devbhoomi' Himachal and there is a reason for it. The role of a 'Devta' and its wishes are a royal and sacred matter in Himachali culture. Their hierarchy of priests, local temples and connected temples is a unique system of faith that motivates a local Himachali to face all the adversities at otherwise absolute beautiful locations. Even the head craftsman of the village is addressed and respected as 'Vishwakarma;' the architect of the gods.

Interestingly it is also an intangible system of governance. These 'Devta' and their priests and Pithu (porters) roam the regions from village to village, temple to temple and gather annually at Kullu Maidan for a Dussehra Mela. The belief is that it is here where they ponder upon the region, people, and its changing landscape. When it comes to protecting their built and natural environment, people of Himachal redefine the meaning of possessiveness. Usually, the laws and rules mentioned before are directed by these 'Devta' with the intent of protection of nature, culture, and people, from invading evil forces. They are the essential soft mechanisms of preservation and protection of their way of life and built environment and have worked wonderfully for centuries gone past!

Who are these invaders in present times? A one-time visitor today can have as many reservations about such practices as one wants but for a community who has been living here for ages, battling its own struggles of sustenance, these rules make perfect sense.

The heaps of non-biodegradables saturating in valleys near all tourist spots, the amount of infiltration of these pollutants deep in forests, snows and the water channels harm the locals first on grassroot levels, before wreaking havoc at regional scale. Today the tourism economy might have opened the gates of the world to local Himachalis, but it also poses an imminent threat to these areas, the structures, the systems, and the people themselves.

When it comes to the protection of the built and natural environment, where the regional governance cannot percolate, the local governance takes over, which is a silver lining of such traditional practices. But that is not the solution to the status quo either.

One needs to understand that sustainable development is neither a brand-new term that will suddenly change how settlements and people function or suggests going back to the lifestyle of the ages gone. The responsibility to bring in the innovation in current and future practice that is informed by the knowledge of the region lies on the shoulders of professionals from all fields, from architecture to governance. Fortunately, we have the foundations for sustainable future practices owing to systems of the vernacular developed over ages. All that is needed now is an attempt at research by these professionals- to observe, learn and implement.

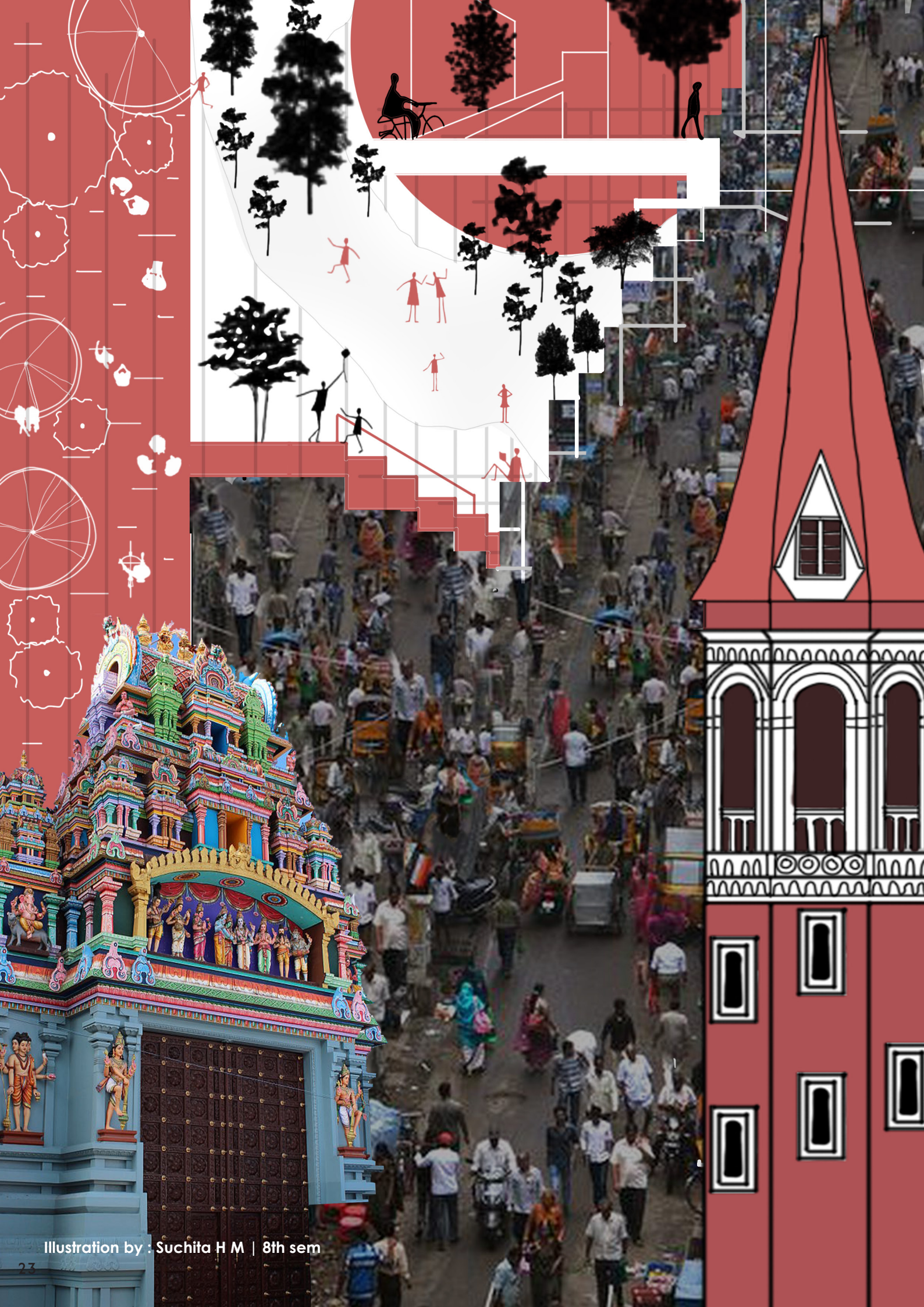

Illustration by : Suchita H M | 8th sem

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Kalpa, Vol.03, 2022, pp. 24-27

REVITALIZATON OF THE RICKETY - A CASE OF GEORGE TOWN

Author : Ar. Dhivya Kumar, M.Arch (A.D)

Abstract :
India is a land of tradition and values. Many parts of the south are identified with different types of architectural styles along streetscapes. But due to the lack of maintenance of the buildings, the essence of the urban streetscapes is lost and there is a need for revitalization of the spaces that are considered to be urban voids. Urban voids not only become derelict spaces but also sabotage the beauty of a place thereby turning these spaces into slums or squatters. Every city emerges from its core and the city development process begins from it. The old city morphs into the central commercial centre, which forms the core city, as the city grows and develops. Cities, like living creatures, require ongoing upkeep and development to function properly, without which city function fails and urban deterioration occurs, which in turn leads to processes such as urban redevelopment, urban renewal, etc., The vision of the research will be to provide strategies to address the issues of urban degradation. The mission of the project is to identify the spaces that are capable of transforming the place as such to create new imagery of George Town, Chennai. The reason for the study is that George Town is at the stage where it has to be revitalised so that there will not be any problems in the near future in adopting sustainable development goals. Design strategies such as rehabilitation (of pedestrian precincts and parking lots), redevelopment (renewed centralization, widening of roads, recreation centres), and enhancement of the environment (public gardens and green spaces) will be identified through figure-ground mapping in the identified area. This paper observes the various developments that are to be done in the near future.

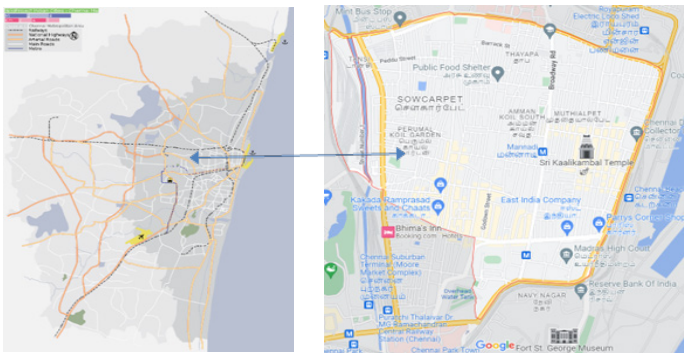
Keywords :
Revitalization, redevelopment, green spaces, settlement, revenue, historic buildings

1. Background

George Town, Chennai is the area from where the expansion in Tamil Nadu began in the 1640s. It was named after King George V. The burgeoning business area in George Town came to be known as the CBD (Central Business District) of Chennai. Due to improper preparation, as well as failure to follow any administrative guidelines for density development, at present, the legacy of the buildings is vanishing. The chief issues should be tended to while doing a reasonable revitalization of George Town. A sustainable methodology for the city is one that gives due significance to the environment, economic value, and should provide inclusive surroundings for future generations to come .

George Town was the origin of Chennai's modern city and was the city's main commercial centre until the early 20th century, but the city's central business district gradually moved south from the mid-20th century and is now known as Anna, located in the Twin Circle of Salai. This led to a shortage of development funding in the northern part of the city. However, some of George Town's community-specific areas, such as Sowcarpet, home of the wealthy Marwari community, are still important commercial centres in the city.

Some of Chennai's most busy market locations are found in George Town. The Chennai Port and the Bay of Bengal coast separate George Town from the rest of the eastern coastal plains. It acts as the command post for Chennai city, which grew out of this little economic hub. George Town is now the city's most important commercial district. A well-connected network of roads and railways connects it to the rest of the city. Burma Bazar, located near Raja Salai Road, is a popular shopping destination in George Town. The area is quite busy, and there is a lot of traffic. Even though the Broadway Bus Stop and the High Court Bus Stop are both conveniently located, overcrowding is a typical issue for both stops.



Location of George town

2. Introduction

Along with its physical growth, the city consolidates throughout time as its limits are widened. Due to the city's ageing, redevelopment and renewal procedures are crucial for the city's regeneration at this time. It has become commonly recognized in recent years that revitalising historic districts and inner-city areas is an effective tool for long-term urban development, combining cultural values with economic prospects and community benefits. Urban agglomeration makes the central business area overcrowded causing humongous stress on the available resources and infrastructure. Therefore, it is crucial that meticulous planning should be adopted for the city to be resilient. Resilient planning must be implemented to meet the needs of the current population, without compromising on that of the urban future.

Bus connectivity

Rail connectivity

3. Historical importance

Madras, presently called Chennai, was founded 375 years ago, majorly for trade and business. It was then known as the Presidency of Fort St.George. This was dependent on the first 'Black Town', where the High Court-Law college campus is currently located. After the siege of Fort St.George by the French, between 1746 and 1759 in two different periods, this Black town was razed. A new Black Town was developed north of Esplanade Road, now called NSC Bose Road, named after freedom fighter Netaji Subhash Chandra Bose. This new Black Town remained the main supplier of goods to the merchants of the Fort and 'White Town', and it was renamed George Town in 1911. The Esplanade was created by the British to provide them a clear field of gun firing in case of future attack. The fortification and creation of the Esplanade brought about a feeling of security in the settlement and encouraged economic activity. By this time George Town had become the Central Business District(CBD) which has now become a major trading region that includes Parrys, Binny and many others.

Madras High Court 1957

High Court and Adjacent Road

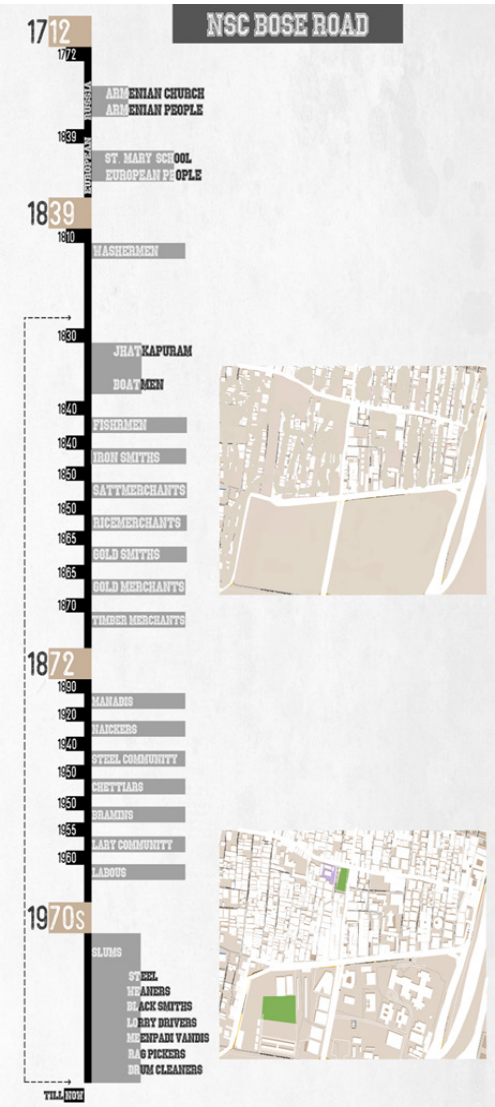
LawCollege at George Town

Around the same time, Bombay got its first railway route in 1853. From then on, the traders of Chennai started to look for a similar transportation system for them to make their businesses flourish. This resulted in the establishment of the Royapuram Railway Terminus on the newly opened Madras-Arcot line in 1856. After the British set up Pax Britannica - a police force, the esplanade was no longer needed. The high court was later built on the esplanade grounds in 1865. This kick- started the institutional land use of the north beach road with the construction of the banks and the post office later on. The growing trade activities caused a lot of congestion in the Royapuram terminus and as a result the central station was opened in 1873 to decongest the Royapuram harbour station. The principal roads (North Beach Road, Rajaji Salai, NSC Bose Road , Broadway street) leading to and from this region were formally built in 1893 to support the fast growing trade. In 1907, Madras Central Station was made the main station of the Madras Railway Company.

Black Town around 1851

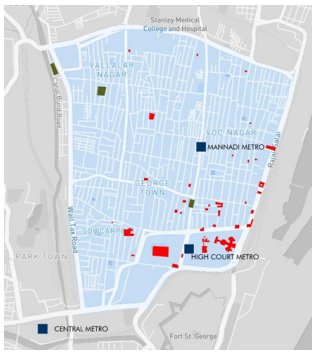
Black Town around 1851

An aerial view of N.S.C. Bose



Evolution of N.B.C road

In 1931, the first electrically operated rail service in Madras began between Madras Beach station and Tambaram. Burma bazaar and China Bazaar started setting up in the different upcoming transit nodes to attract the maximum potential buyers. The Madras Transport Corporation was inaugurated and bus transportation was brought under the government with the establishment of the Broadway Bus terminus in the 1970s. By 1991, George Town was overflowing with people, trade and its related activities and became too congested. Hence plans were made to shift the bus terminus and the Kothwal Chawadi Market. In 1995, the plan materialised, shifting it to Koyembedu. In 2002, the Koyembedu CMBT (Chennai Mofussil Bus Terminus) was inaugurated.



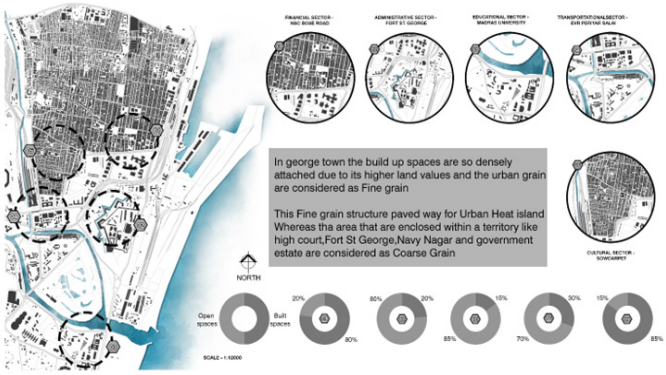
Heritage buildings at George town

The George Town area was developed prior to the days of the British invasion. The buildings constructed before and during their regime are considered Heritage Buildings. The concentration of heritage buildings in the George Town area is in the southern parts. There are about 52 heritage sites in the study area, which account for 1.3 per cent (60,838 sq. m.) of the study area.

Heritage building

Metro station

Open green



Urban fabric at Georgetown

4. Why is george town in a rickety state?

ISSUES	***SOLUTIONS***
Parking in the region has always been a havoc	Policy making for the street vendors and hawkers are to be framed
Encroachments on the streets of the region have been chaotic	Policy making for the street vendors and hawkers are to be framed
Heritage buildings are not maintained properly which diminishes the imagery of the region	Conservationists must take due care to maintain the legacy of the buildings
Lack of green spaces	The region has to be planned by adopting new urbanism principles, with the expansion of existing open spaces, and building of new green spaces for the city.
Slums	Proper habitation spaces are to be provided
Non-resilient planning that leads to occasional flooding as the region is near the coast	Building a strong system that reduces the effects of flooding and other natural calamities, such as lake restoration, building of efficient stormwater drains, removal of blockages in waterways, or using nature-based solutions or blue-green infrastructure
Relocation of street hawkers or vendors has been a sensitive problem since they do not wish to relocate even after development authorities providing them by quality infrastructure	Concerned authority has to join hands with multi-disciplinary organisations that involves the benefit of associations of street vendors and hawkers to uplift the livelihood of the people

5. Design interventions

Revitalization of George Town can be done by enhancing the architectural quality, and building social inclusiveness that engages people of the place.

It is crucial that Georgetown is revitalised by building resilient infrastructure, and fostering innovation such that the region grows to promote inclusive and sustainable commerce.

Businesses and small-scale industries operating in the region should have increased access to financial services, such as affordable credit; they should also be integrated into value chains and markets. Financial services and access to banking facilities are paramount for enterprises to function smoothly, flourish and expand.

In addition to this, infrastructure and industries must be developed to function sustainably by using resource efficient methods of production and sale, as well as ensuring they are in accordance with environmental concerns.

Domestic technology and services should also be applied to George Town by ensuring a conducive environment for such innovation. Information and communication technology should also be available to businesses to carry out conveyance and transactions.

Georgetown must be developed in such a way that settlements are inclusive, safe, resilient and sustainable. Safe, adequate and affordable housing along with basic services, must be provided to residents of George Town, especially those who live in slums.

It is also extremely important that connectivity is ensured, with proper road safety and sustainable transport systems. With this, there is also a special need for emphasis on the requirements of marginalised groups, such as, but not limited to children, women and the disabled.

In this process, George Town's architectural and cultural heritage must not be erased, as it is integral to its legacy. Most importantly, the per capita environmental impact must be stressed upon, by focusing especially on improving air quality, and waste segregation and management. Provision must be made for green spaces that are safe, inclusive and accessible to all residents and visitors of George Town.

6. Conclusion

Due to rapid urbanisation, with up to 1.4 million people per week moving into urban areas, cities have lost their identity. The land use itself has changed in George Town, therefore the bye-laws are to be followed properly. During the construction process, the project must abide by the rules and regulations that are framed by the government. Public policies that promote resilience must include public procurement processes considering climate resilience in competitive comparisons and bidding considering the cost over the life of the asset under an alternative scenario. Serious effects of climate change are expected in the upcoming years. It is utmost in the hands of architects, urban planners, urban designers and all the stakeholders involved in the project to make it sustainable to meet the needs of the future generations that are to come up.

Forecast unit counts were also mapped and are shown to b e quite heterogeneous, even at small scale. These fine-grained differences can be important for decision support.

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Kalpa, Vol.03, 2022, pp. 28-29

My Fair City

Author : Ananya Nayak

Abstract:
Urbanisation today in countries of the global south, fraught with challenges of low-middle income groups dominating the population, is emulating unsustainable, resource-intensive patterns of high-income countries. These are augmented by global mobility, globalisation of architecture, construction and design firms and globalisation of media and communication services. The sustainable development goals dictate the shared fate of humankind in the face of sustainability challenges, irrespective of the skewed balance in terms of resource availability, access and consumption. A double paradox that exists is the seemingly feasible game plan to make well-resourced cities of high-income countries more sustainable which remain plagued by issues of power relations and vested interests of stakeholders within them. On the other hand, some might say cities with widespread poverty, resource and service deficits can be considered easier to amend. Neither argument holds good since sustainability is a complex subject bearing triple characteristics- a normative aspiration, a state of being and the means of attaining that state.

Urban areas can therefore lead or lag the sustainability movement, but these can exist only when societies themselves are sustainable. The twin challenges of urban design are the building of new urban areas (alternatively known as cities to come) and new urban segments in growing cities while also redesigning old urban areas in accordance with the emerging principles of good practices of sustainability. India's resolve for net-zero carbon emissions by 2070 and leadership in the international solar alliance are catalysing conversations in the architecture community. A country braving natural disasters with unfailing regularity and simultaneously struggling to provide its marginalised millions with basic amenities, is a unique urban model. The context for sustainable public spaces is strong in a community-driven tight-knit society like india. However, as our cities aspire to morph into glass boxed high-rise urban skylines, these simpler vernacular public spaces lose prominence. Gated communities foster exclusion, disproportionate allocation of resources remains, and disorderly settlement patterns intensify.

Keywords:
Sustainable public spaces, Pandemic, Power play, Urban equity

Public spaces are the key drivers of urban growth, reflecting the indices of urban prosperity and economic growth (Cohen, 2018). With a UN Habitat prediction of 70% of the world's population living in cities by 2050, the growing concerns about sustainable urban models and sensitively designed public spaces cut across geographies. The United Nations Sustainable Development Goals, intend to direct policies towards inclusive, safe, accessible and green public spaces for everyone including women, children and the elderly (Public Space & Sustainable Urban Development, n.d.).

However, the unsettling reality for a young Indian girl like me, who travels across cities for work and learning, is the absolute absence of public places like the ones the SDGs discuss. While the UN website reflects some grim data and infographics on this landing page, the reality on ground is far worse.

Amidst the second wave of the global pandemic, I moved to and lived in two of India's top cities, Ahmedabad and New-Delhi. As an architect, seldom is our work tied to the desk and is restrictive in movement. I travelled within and beyond city limits to sites, to meet clients, to socialise and entertain. From sanitation to safety, my concerns were numerous. On construction sites, a portable toilet clean enough for women is sadly a distant dream with a handful of women around. In smaller offices of design firms, washrooms are often shared by all genders which comes with its own hygiene issues. On roads, the story is no different. India is at the cusp of an economic growth average of 6-7% in the next couple of years and is showing no sign of recession unlike the US, UK and parts of Europe. But there remains a dark cloud looming large over issues of gender equality in the most basic amenities and can be substantiated by examples that an average working woman like me cites. The Sabarmati Riverfront, Ahmedabad is too dimly lit for evening walks alone. Public toilets on the streets of metropolitans like Bengaluru and Delhi are non-existent or defunct. Sustainable public spaces are not merely pointers in election manifestos, they are bare necessities.

If urban planning remains dependent on those who wield the power of the states, then the democratisation of public spaces is a distant dream.

Now is the cue for India to exhibit the power of its people and make community-driven urban planning a reality, keeping in mind its women. The UN remarks meekly that gender equality cannot be achieved by 2030, the timeline pushed further owing to the pandemic. But barring the unforeseen

pandemic, were we in a good place with the projected timeline? I watched from my office desks both the second and third wave of COVID, in Ahmedabad and Delhi, in that order, and have

noted similarities in the socio-economic fallout of the female gender. Traditionally caregivers, women found themselves looking after families while managing their work from home schedules. Pay disparity persisted, domestic violence doubled, and the pandemic amplified existing woes.

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The Purview of Urban Design and Planning in Bangalore

An Interview with Ar. Brinda Sastry
Date of Interview : 27-10-2022

Brinda Sastry is an independent urban design and planning practitioner who has worked in India and abroad with various private, public and non-profit organizations. She has been a Visiting Faculty at various Architecture and Urban Planning programs in India and abroad, and an Adjunct Faculty in the B. Arch. and M. Arch. programs at RV College of Architecture, Bengaluru, since 2004. Brinda's professional and research interests are at the intersection of spatial planning, urban governance and urban design policy. She has worked on national mission projects; regional, city, and local area plans; TOD plans; and several urban design projects. She develops methods and institutional arrangements to embed place-based urban design strategies within an inclusive, equitable, livable and sustainable planning framework. She also provides technical assistance to citizen groups and conducts capacity building and public participatory programs. Brinda holds a Masters Degree in Architecture (Urban Design) from the University of Oregon in the USA, and a Diploma in Architecture from CEPT University, Ahmedabad.

Could you describe your experience as an Urban Design and Planning practitioner in Bangalore?

I have been working as an Urban Planner and Designer since 2000 in Bangalore. Mostly, my work is in the public sector, where I have been a consultant to private firms or NGOs assisting in design and policy recommendations. Broadly, my work focuses on developing plans and policies for cities and local areas with a focus on a participatory approach. One of my recent roles was as a consultant with the GIZ, an enterprise of the German Federal Government, on a project for making Gandhi Bazaar street market pedestrian friendly. This project, which is currently underway, is supported by the Directorate of Urban Land and Transport [DULT] and the Bruhat Bengaluru Mahanagara Palike (BBMP). Prior to this, I was also involved in the Bangalore's Revised Master Plan 2015 and the Bangalore Metropolitan Regional Plan 2031, where I worked on the visioning, preparing policies and the zonal regulations.

In the NGO sector, I have worked as a consultant with EMBARQ (now WRI), on a transit-oriented development [TOD] project, for the CMH Metro station in Indiranagar, where we developed a framework for implementing TODs in Bengaluru. I was also consultant to the team that worked on the Ease of Living Index- Phase I, with the Ministry of Housing and Urban Development. Here we developed methods for assessing 79 livability parameters for 116 cities in the country. Most recently, I've been working with a Bangalore based NGO called Vidhi Center for Legal Policy on auditing several Judicial Court buildings to ensure that their infrastructure and their design is responsive to stakeholder needs, and they are as per established norms. We intend to develop a handbook for court design from this audit.

Generally, I work as a volunteer with some citizen groups and NGOs to give technical advice. I've reviewed master plans of different cities such as Mangalore, Hampi, and Karaikal. It involved conducting critiques of the plans and providing them with technical assistance so that they could submit it to the government. Also, currently, I'm working on doing a social impact assessment of one of Bangalore's metro lines on vulnerable groups around the city, and we came up with some recommendations for mitigating the impacts in discussion with the international funders. And of course, I also do some independent research work. Generally, I keep myself busy with following different kinds of activities in the urban space of Bangalore.

What opportunities does Bangalore offer with regard to your field of work?

I think Bangalore has a very unique environment in terms of its natural and ecological systems. As an urban designer you could exploit some of these features and make them core to the identity of the city. When I first came here in 2000, there were very few opportunities for an Urban Designer to work because Urban Design wasn't very well recognized in the government circles as a profession. So I think it took about

three-four years before I could actually do something that was meaningful.

The first attempt where I could engage in participatory planning was through a consulting firm based in Bangalore for a JNNURM project, but that was in Goa. In Bangalore, my first attempt was to work on the master plan in 2003 or so, which I think was very interesting because it was the first time that the team was keen on using different planning methods. Bangalore had never had a GIS database at that point. So once it was put in place and the ground reality, in terms of the natural tank and valley systems, was digitally recorded it was an eye-opener for everyone. The master planning process was based on principles of balancing development while safeguarding the natural systems. A similar approach was envisioned for the Regional Structure Plan for Bangalore. For urban planners such opportunities were rare. But increasingly, now, there are many opportunities for young and experienced professionals to become a part of the government system through the Smart City Mission projects, and various national schemes and design challenges, although it is not the same.

There are different venues in which you can participate and if you are active in the professional circles, you will be part of some discussion or the other. Most recently, there was a discussion on climate change. Bangalore is preparing its Climate Action Plan in collaboration with WRI. They are very clear about the fact that we need to have various voices in this plan making process. So in a way, the government is slowly opening up to engage designers and planners in their urban development process.

You've co-authored the chapter- Intelligence for place-making and social inclusion in a book called "The New Companion to Urban Design". In reference to that, could you tell us how we can move forward with the idea of an ideal city?

That particular chapter speaks about the Smart City Mission. It was a critique on how technology is used through the Smart City program where a lot of schemes and projects were being implemented in the mode of "command and control". It was not adopting a decentralised approach which would be a little closer to the people and the on-ground social conditions.

In the article, we were highlighting that technology can be used for enhancing people's lives and including them by building social networks across time and space. There was an example in that article that talks about how Wi-Fi connectivity in remote rural areas is really helping people, especially migrant labourers who needed to connect with their families. It also gives an example of positive social spaces which are created where public WI-FI nodes are available at local tea stalls. It also touches upon some negatives in terms of how such public WI-FI nodes can become gendered social spaces, because mostly men gather there.

Upgrading infrastructure and making it more efficient were objectives of the Smart City Mission. While not denying that we need this, the chapter emphasizes that the Smart City Mission also needs to pay attention to other aspects of social inclusion. That would help us be closer to the idea of an ideal city.

What is your perspective on the way TOD's are being planned and implemented in Bangalore?

A draft TOD policy was released by the BMRCL along with the DULT in 2019. In my opinion, it seems to be a real estate oriented policy, where focus is on agendas of private sector developers. Often, this is not necessarily responsive to the needs of the local population and the ground realities of possible development opportunities. The blanket application of high FAR is not feasible in some station areas. The WRI along with the DULT had put together a very good TOD framework in 2013 or so, where the basics in terms of the design of the station's accessibility and the method for application of development regulations based on station typologies were framed. So I think one can hope that it will work in the right way.

The TOD agenda has to be integrated with the master plan and currently Bangalore doesn't have an updated master plan since 2015. It needs to be integrated with the broader vision for the city and we cannot have a similar approach for every Metro station. A holistic approach that integrates the private sector goals and the common people's needs will go a long way. Also, testing of the proposed regulations and policies is important to bring about realistic results.

How would you describe your idea of an ideal city and how has this perception changed over time?

When we speak of an ideal city, the question that arises is - For whom? Whose city is it? - as Sassia Sasken, the noted sociologist and economist asks. Speaking in the context of Bangalore, ideally, we need to nurture a participatory environment where different sections of society are involved and their needs are addressed. There needs to be a big emphasis on the ecological features and the cultural aspects of the city, and this needs to be woven into the vision for the city. At the same time, I think the people need to be provided with choices for how they can engage with the city- whether it is in terms of the transport choices, or employment choices, or housing choices. The ideal environment would be that you collaborate with the political class, NGOs and the private sector - most importantly, because they are ones who have the opportunity to make investments in the city.

For me, over time, the ideal wouldn't change, but the method or technique of achieving the ideal may have changed a little bit.

What are your views on the evolution of urban ecosystems with regard to time and climate?

The urban ecosystem within Bangalore is intrinsically linked with its natural systems. I think as far as climate change is concerned, and if you consider the most recent flooding issues that we have faced, to address that and safeguard these natural ecosystems is the first key thing. The question is: How do you actually bring about, not necessarily a balance, but a judicious response to protecting the natural resources of the city, which we are so dependent on, and we are depleting regularly? With the changes happening in the city, we have been encroaching upon them and stifling it to a large extent.

Over time, we have come to a stage where we have not been able to protect the resources and our city's development has taken over.

Secondly, we need to enhance our green areas and bring in a lot more other elements such as retention ponds or greenery to reduce the pollution levels, and manage the increase in the temperatures which we are experiencing. So building regulations also need to be changed to be responsive to such aspects, in terms of energy consciousness, greening, planning for open spaces and planning for areas where we can actually support public activity.

Have you ever shared your ideas on a public forum? If so, what effect did it have on your audience?

I haven't really shared ideas on a public forum, as in social media. But I have written a few articles and spoken at many invited talks and discussion sessions, both professional and academic. In one article I wrote for Citizen Matters, I provided a response on the Urban Design chapter of the Master Plan 2031. I don't think I got any responses directly, but I have spoken in many professional and citizen-led fora on the similar topic of urban design in the master planning process, where I have received acknowledgements.

I think the best engagement I have had is with students. I just find that it is much more effective with students because it's a learning environment for both the student and the tutor. In this environment, we can mutually nurture certain ideas, think, question and debate. This is where I've received more responses in terms of how it has helped or benefited students in their thought process or, say, when they are choosing a thesis topic.

What effect did your work have on city development and to what extent have your ideas been implemented?

In Bangalore, the Gandhi Bazaar project for making the street pedestrian-friendly, which I am involved in, is underway right now. We hope that it will enhance the cultural identity and spatial design of the place. Most of the other projects are at a policy level. They are adopted and being used, for example, the master plan and the regional plan- but they're dated. The project of assessing the impact of the Metro rail on a particular vulnerable community, got the attention of funding agencies like the European Investment Bank. They are now having a dialogue with the BMRCL to compensate this particular group that has been affected.

The other work is the Judicial Court buildings audit processes. There is a very good chance of us coming out with a Handbook for Court Design, which I think will be a fruitful realisation of our efforts and a useful guide for architects and designers. It is underway, and it has received the support of senior Judicial officers.

Also, several of my city and neighbourhood level policy and design guidelines work I have accomplished when working in Portland, USA are officially adopted and city development is being shaped by them even today.

As a professor teaching the next generation of architects, how do you think the curriculum is sensitising the above discussed topics?

My longest stint of teaching has been at RVCA and I think students here are definitely being exposed to these ideas of city development at the Masters level. At the undergraduate level too, whenever I get the opportunity, I raise questions on responsiveness to the natural systems, the balancing act between development and protection of natural eco-systems, and the negotiations we need to make. The curriculum needs a better focus on how we could actually protect our resources to our advantage, while being socially responsible by looking at the diverse communities and their needs through a participatory approach.

There is a sensitivity… I think it is slowly changing. In the architecture program, I think many new subjects are being introduced and that is making students become more aware of the social dimension of architecture, the environmental aspects of architecture and also the climate perspective.

The other part of sensitising students is to do with making them think about these problems. Thinking about "How do we address this? What's the best way to do it?", because there are no solutions; they are processes which keep changing.

I was part of the initial team that formulated the VTU syllabus for Masters in Urban Design at RV College. We recently revised the Masters curriculum and we have been consciously trying to update it with the view that there are new problems and new ways of looking at how cities can be planned and designed. The syllabus is focused on equipping the students by getting them exposed to diverse aspects of city planning and design by introducing new electives. We have an elective on public participation, on urban design techniques, on GIS and others. We also have an elective on Indian Urbanism, where we get students to be sensitive and conscious of the fact that we live in a very informal and diverse setting with varied cultural practices and architectural responses.

The teaching methods also matter – such as how we expose the students to the challenges of the urban world. We do quite a bit of fieldwork. We do a lot of group work, trying to get students to understand the importance of collaboration in coming up with solutions. I don't know how effective it has been, but we do try to do this.

What would you as a professor consider major hurdles to your contributions with regard to both the fields?

The VTU schedules that are posed by the curriculum can be limiting. An autonomous institute would have more flexibility in their teaching methods. Another thing is also availability of information in terms of access to some international journals, especially in Urban Design and Planning. But, I think the college has been taking initiative to expand this. The environment where I'm working in terms of teaching is great because I have fantastic colleagues and I feel like that is making up for everything else.

How could Urban Design promote culturally rich spaces?

Urban Design holds a very huge social responsibility, and as designers, being responsive to society and its cultural practices is very important. I think we can do this by studying these practices and coming up with sensitive design options for how to respond to the needs of the people. Whether they are through conservation or through building new design strategies, we need to incorporate and enhance our cultural practices.

I'm not talking only about traditional cultural aspects but also changing cultural aspects. I think it is important to understand the connection between the people, their culture, their practices and the markers and places that are representative of those cultural aspects. So whether it's in a traditional environment or even in a modern situation, it has to be accordingly designed to acknowledge the richness of cultural diversity.

Could participatory inclusive planning play an important role in the sustainable design of Bangalore? If so, how?

Yes, if we do adopt participatory processes in making decisions for how Bangalore should grow and how it can be planned and designed, as mandated in the 74th Constitution Amendment Act, we will be opening it up for people. There will be more choices to live, work, and also recreate in, and that would help to make it more inclusive. It would also help in getting people to become more responsible for their actions, and involving them in this process will make them owners of any of the decisions. It can definitely help make the city sustainable from different perspectives, not necessarily just from an environmental perspective, but also from the perspective of keeping people engaged.

What motivates you to continue your efforts in your fields of work?

What motivates me is the opportunity to see change in my area of work. I'm always looking for new venues to intervene. So an opportunity where I can push the agenda of making sure that design gets done in a participatory way, and in a collaborative way, is something that excites me. In the little research work that I do on the side, I try to create these agendas for myself, where I think I could pursue my interests. So what motivates me is the passion for the profession, the passion for teaching particularly. I just enjoy working with students and any opportunity to make sure that I'm able to share and sensitise others is motivating.

With respect to your field, what are the various challenges you have faced after the pandemic? Have there been any drastic changes?

I feel like the pandemic definitely slowed things down, and made one a little more self-aware of where one is going. From the teaching perspective, I found that it was harder to teach through the online platform.
In the city, I don't think there have been too many changes as we have mostly reverted to the pre-pandemic situation. But, we have learned lessons on how to be sensitive to future threats of a similar nature. The challenges were compounded due to Covid, but what we need to do in terms of inclusion, ecological sensitivity, and other aspects are still a part of the ideal.

How do you think students and academicians can help in achieving the ideal city?

I think students have an opportunity to be active, and the more they are sensitised to problems of the city and designing in the city, the more opportunities they have to engage with. In the Urban Design field, graduates are actually working with NGOs and building careers with them as they feel like they can make a difference and apply their skills and knowledge. As volunteers, students can contribute a lot. As part of some of these organisations, they can go look at issues on the ground and contribute, not as an activist does, but as professionals trained to do certain design activity that meet the ideas of an ideal city.

I think, as academicians, we need to do a lot more empirical research. While theoretical research is good, empirical work involving data collection and on-ground surveys are useful to draw out conclusions from various cases. From an academic perspective it is extremely important because this helps to understand the subject matter better. Fortunately, a lot of us academicians have one foot in the practice, so we are exposed to some of these things and hence, teaching gets bolstered with all of those experiences that we have.

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Placemaking in Bengaluru

An Interview with Ar. Madhura Kulkarni

Date of Interview : 03-10-2022

Madhura Kulkarni is a Program Manager with the Sustainable Cities and Transport program at WRI India. She currently manages the Nurturing Neighbourhoods Challenge, an initiative by Ministry of Housing and Urban Affairs focused towards health and well being for young children and their caregivers in Indian cities. She works on initiatives related to inclusive development focusing on different age groups, abilities and gender. Her work involves street & public space design, community engagement and capacity building for government and non-government organizations and supporting them to establish processes to achieve long term sustainability. Her research is currently focused on developing street design toolkit to suit needs of young children and caregivers. Madhura holds a master's in Urban Design from School of Planning and Architecture, Bhopal and bachelor's in Architecture from Nagpur University. She was a gold medallist in her Bachelor as well as Masters degree.

How have the last couple of months been with everything opening up after the Pandemic?

The Pandemic made us realize how much we crave the great outdoors. Cities began to take up placemaking as a way in which we can also have social distancing or 'physical distancing', I would say. There's still some warmth in connecting with people. A lot of initiatives have been taken up in our cities during the Pandemic especially in the process of not just recovering but also understanding the importance of public spaces and social interactions. By taking smaller trips on foot or by cycling, the importance of having our daily necessities near home has come to light.

Various national initiatives launched by the Ministry of Housing and urban affairs, such as placemaking marathon, the cycles for change challenge, streets for people, nurturing neighborhoods and many more which have created a momentum towards created public spaces in cities. Every challenge focuses on different aspects of how we can develop cities for people while being inclusive women, children, elderly and differently abled.

While these initiatives have started as a response to the pandemic, cities are now working towards institutionalizing them and scaling.

In your opinion, what exactly is an ideal city? How has a city's ideal changed over time and how has it been perceived? Furthermore, how do you think cities can be molded to better perform under distress?

There cannot be an ideal city. A city is livable when there are equal opportunities for everyone. As far as urban environment is concerned, a livable city should have clean air to breathe, safe streets to walk for people of all age groups and abilities, comfortable and reliable public transport, access to nature, parks and play areas near their houses, accessible healthcare and education. There's a very famous saying, said by the Mayor of Bogota," the developed countries are not places where poor have cars, but it is where there is a rich use public transport." Have cities changed over time? Yes, we have seen a lot of cars on roads, and they are being designed for cars. But non-motorized transport including pedestrians and bicyclists have more that 50% of mode share on our streets. We need to focus on them to reduce use of private vehicles which are a major cause of air pollution. Another way is to build cities to be climate resilient by incorporating systematic approach towards greening the cities, rainwater harvesting, rejuvenation of the green and blue infrastructure in the city, etc. For better performance in distress, we need to prepare today.

You work with partners to change cities from the inside out, along with creating inclusive and people centric designs. How exactly do you aspire to achieve that?

I am currently working at the intersection of early childhood development and urban development as part of my engagement with the Ministry of Housing and urban Affairs and smart cities mission. I am leading work under the Nurturing Neighborhood Challenge where we are supporting 10 cities across the country to support interventions for designing neighborhoods while incorporating needs of of young children- zero to five years old and their caregivers. Especially from the vulnerable communities because they have poor access to mere necessities such as access to

anganwadis, primary healthcare centers and parks and public spaces.

To be able to bring any change, it is very important to understand the barriers for that change to happen. It is not just infrastructure that is required, but a supportive behavior of all stakeholders to be able to create sustainable change.

To give you a small example, many times we design a beautiful park, but is it is not used. There could be various reasons for this- may be the there are more elderly who want to use the park but the design does not have space for them to rest, mothers with babies and toddlers want to use the park but all play equipments are for older children and nothing for babies or may be the park is locked for most of the time or children from nearby slum are not allowed to play in the park, park is not maintained and is dark in the evening making it unsafe. Then what is the use of such spaces?

To be able to make design work, govt. officials need to understand the needs of the users, collect data, activity mapping, intercept surveys from the residents nearby (civic engagement). Design must be prepared based on the data analysis- go back to people, discuss and incorporate their needs. This creates a sense of ownership among the community and they themselves start taking care of the space, ensure safety. These kind of supportive behaviours from government officials and community make a public space project work!

Congestion, fuel waste, harmful transport emissions and other concerns affecting our health and well being are all symptoms of inadequate urban infrastructure in almost every metropolitan city in India. Do you think your work has changed it in any way?

Yes, congestion, fuel waste, all these emissions do affect the living conditions of the city especially the vulnerable- children. We are working with cities to develop strategies towards greening in the city. Solutions such as mass plantations with native species, peripheral plantation to improve air quality in public spaces, increasing green cover which act as points for absorption of rainwater. Cities can reduce transport related fuel consumption.

Transport is a major reason for emissions. Creating pedestrian infrastructure has been one of the areas of work that I have been working across a lot of cities. We've supported Bengaluru to create cycling infrastructure as well as safe walking infrastructure in some areas. These initiatives are towards encouraging people to shift to public transport from private vehicles.

How exactly is road safety ensured for non-motorized vehicles? Assured through your plans, how do you plan to encourage people to adapt to environmentally friendly travel options like walking and cycling?

Majority of street users in India are motorised street users which means the walk and cycle. Most of the people are pedestrians at some point- either they walk to catch an auto or to bus stop or metro station. Their road safety is ensuring safety of pedestrians and cyclists from the motorized vehicles on the street specially at crossings, junctions. This can be achieved by providing a dedicated space for pedestrians and cyclists on the street, providing a network of continuous unobstructed footpaths, cycle tracks, pedestrian crossings, traffic calming specially in the neighbourhoods, near schools, hospitals, parks and gardens where we generally see high footfall of pedestrians. Some design elements such as green buffer between the carriageway and footpath helps in ensuring safety of pedestrians and cyclists from vehicles.
Creating infrastructure and encouraging people to shift to sustainable modes of transport go hand in hand.

Bengaluru has seen various campaigns as Cycle Day which is organized by DULT is one such initiative to being communities to cycle every month. There are a lot of other campaigns conducted for encouraging people to cycle to work, use public transport. One way is to create demand through campaigns from the people and other end is creating network of infrastructure for people to walk and cycle safely. We supported Directorate of Urban land transport and Bangalore Smart City to design and implement cycle tracks and cycle lanes.

Currently isolated, discontinuous footpaths and cycle tracks exist in the city, but a network of footpaths and cycle tracks are required for people to use it safely and more often.

How important is it to survey people with their opinions and experiment with design iterations accordingly? How do you think we, as a society, embrace community? In order to ensure equity and accessibility, how do we ensure that most vulnerable groups of the population that are at a risk of social exclusion are given that special attention?

I will give you a simple example from Kohima where we are working on the Nurturing Neighbourhoods challenge. They developed a pocket park, in one of the neighbourhood. It was created in such a way that people in the community come together, they crowdfunded implementation of that park. So, in every stage of design, they were involved, starting with data collection, and understanding their issues. We could look at converting research in every stage of design. What happened post implementation was the community around pitched in and said that we will maintain it. And even when I visited six months later, it looked as it was, very well maintained. This is what we can achieve through community engagement. It is extremely important because this helps in sustaining a project in long-term. Community engagements help creating champions among the communities. These champions then help nudge and create more spaces, walkable footpaths or cycle tracks or public spaces.

How can we improve vulnerable groups. We did a spatial analysis of green spaces in Bangalore where we realized that there is a clear gap in access to gardens and parks around slums. This kind of analysis helps us to include one segment of population while planning.

My current project also looking at improving access to public health care centers, anganwadi, public transport. In many cities slums are situated in low lying areas. Every time it floods, they are the ones who end up getting affected. So, we need to look at building resilient infrastructure as well. One of the examples from Indore where we are supporting

in building climate resilience through improving green and blue infrastructure by creating of 500 parks across the city. He locations of these parks are also being decided based on spatial mapping and data analysis while focusing on the vulnerable settlements.

Describe the ways in which you believe that contributing to the Sustainable Development Goals will enhance inclusion, safety, sustainability, and disaster resilience in cities.

Creating resilient infrastructure has a major role along with public spaces in building such communities, having participatory planning, user centric planning, scaling, and sustaining, are also very important. Man key towards doing all these initiatives is to test solutions which can be improvised and replicated all the time. Scaling these initiatives, institutionalizing them for long term sustenance is the key. This requires capacity building of everyone involved, dedicated finance, constant civic engagement. To make this happen, communities, government and non-govt agencies have to come together.

How can we design a solution to increase sustainability in local communities? Does public space design have a role to play?

There are so many examples where we have engaged with communities, and they're signed with the city governments for operation and maintenance of that space. Another thing I wanted to mention in terms of community engagement is that in a lot of places we generally end up designing public spaces, but the crime rate is high or there's a lot of activism which is seen. But if we involve communities, it helps in changing their behavior towards the space because when they take matters into their own hands it becomes their space and they tend to take ownership of the space. It's a two way approach and is generally negotiated based on the community it is built for.

What would you consider a halt with respect to your work, ideologies and contributions? What motivates you to continue your efforts in the field?

There is a daily struggle in creating these spaces and nudging cities to create these spaces with interest. So there are many challenges which come up on a daily basis. Considering working with cities, a challenge arises when there is change in leadership . Let's say we are working with one CEO or the Commissioner, and suddenly the next day he or she gets transferred. We have to start from zero all the time. This is one of the major issues we face everywhere. It takes time to build a particular idea and sell the idea to the other person because they might have come from a different mindset, they might have come with different priorities or they want to do something else. Many times, funding is a problem. Now, the Smart Cities Mission is set to end next year. So, the project gets stalled.

Another thing that we are also experimenting with is how can we get CSRS for cities? How can we ensure convergence with different other schemes that the government had? So, we look at different ways to transform the city for the better, and we face challenges everyday. At times there is no political support. Then, in that case, how can we keep talking to them, keep nudging them, keep telling them how this will help?

We tend to use various strategies to convince them. If there is an upcoming election, we need to tell them that if such initiatives are taken forward for the public, then it would add value to their election . It's a very different strategy every time - changes, funding crunch, and political support, and there are so many such things. But the only thing that keeps me going is looking at the efforts that people have made.

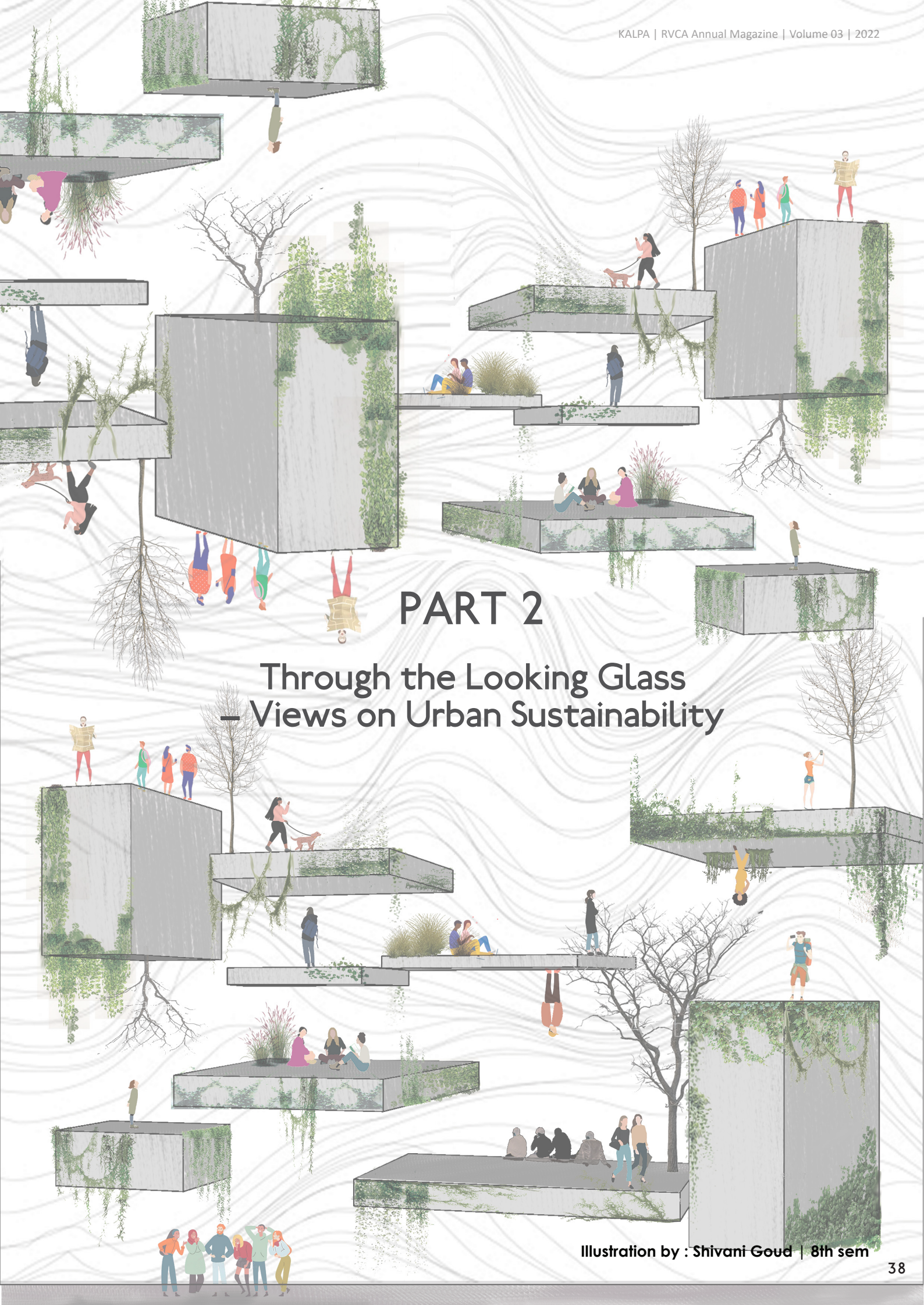
People have been working, NGOs, have been talking and advocating around this for so long, and we have come so far because of their efforts. So it's our responsibility. Especially as architects, as urban designers, we have that tool. We are the ones who can create drawings, we have been trained to do that. How we can use it towards a greater good is something that we should look at. I think that's what inspires me every time. How can we use it in the best way possible, to create something that people can own? So that's what keeps me going I think.

Again, with respect to your field, how has it been recovering from the effects of the pandemic? Have there been any drastic changes then and how do you see the cities developing in the future?

With the measures taken up by the Ministry of Housing and Urban Affairs, we are moving ahead with implantation. One important initiative where more than 70 to 80 cities participated was the 75-hour placemaking marathon. Piano festivals were held, where people came together and it was the first-time people came out of their houses. Children came to paint on walls too. A lot of things in those 75 US cities were able to transform so many spaces across the country. We supported around 10 cities to do this. These are initiatives being taught across the world right now. But how do we scale it? Can we institutionalize it? How can we generate demand and supplies? Hiring designers is another area that we are working with in cities to develop this. Now, it is up to cities to make it long term.

This entire process is quite long. And there's a lot of scope for all of us to volunteer. So is there a way in which students in particular can help out, or is there a volunteering system?

Yes, this role of academic institutions is very crucial. Architecture students especially, have this tool of design. It's great if you can participate in certain competitions that are being floated by the government agencies. That's a way in which you can support cities to be able to develop. The Directorate of Urban Land Transport has fellowship programs. They partner with academic institutions to run a studio, so that is another opportunity where institutions can engage their students. Students can take up live projects, a form of workshops, then we can take those designs or insights to the city governments, and they could be tested on the ground too. In data centric planning too, students can conduct surveys. So we as WRI also engage with students and encourage the same.



PART 2

Through the Looking Glass – Views on Urban Sustainability

Illustration by : Shivani Goud | 8th sem

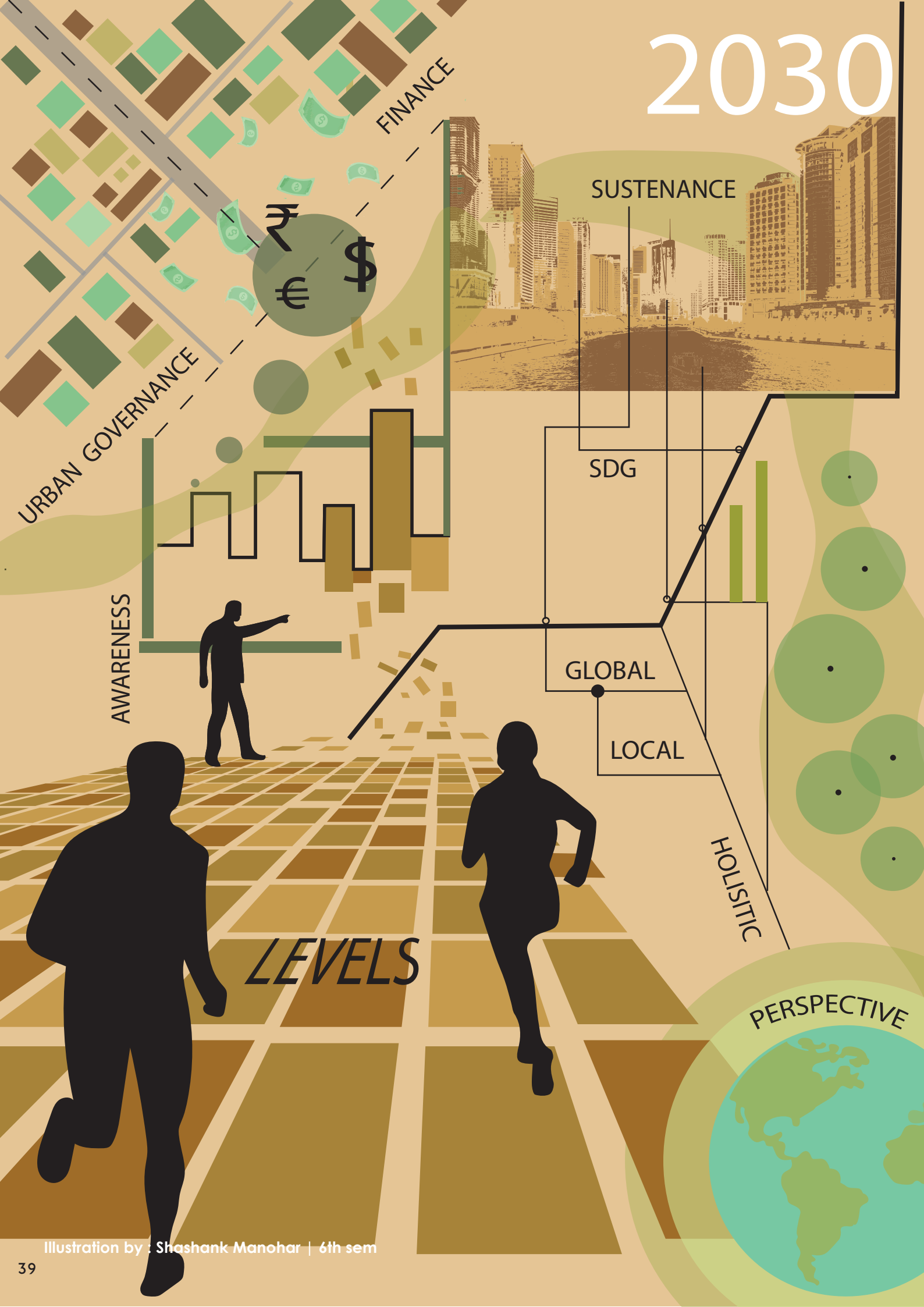


Illustration by : Shashank Manohar | 6th sem

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Kalpa, Vol.03, 2022, pp. 40-42

GAMIFICATION OF SDGS – Alternate approaches to sustainable futures

Author : Ar. Vidhya Mohankumar, Founder & Principal – Urban Design Collective

Vidhya Mohankumar is an architect and urban designer with 17 years of work experience in India, Ireland and the United States. Her work is focused on creating cities that are people-oriented and centred around transit as part of a sustainable development agenda that she is passionate about. Her approach is driven by research that is grounded and intersectional as a way to understand the everyday urbanism of cities.
With clientele ranging from state governments, urban local bodies, county/town councils, private sector entities and NGOs, her urban design projects exhibit a wide variety with master plans for cities, towns, station areas, harbour areas and their environs as well as redevelopment plans for town centres, city public spaces and brownfield sites. She has also been involved in several strategic planning projects, regional plans, local area plans, campus master plans and urban design studies for existing developments in various cities around the world.

Abstract / Introduction :
Given that the SDG 2030 framework is rooted in a diverse and multi-stakeholder platform, gamification as a tool for promoting and achieving SDGs becomes all the more valid owing to its universal appeal. The range of audiences that were considered in the design of the game includes elected representatives, bureaucrats, urban local body officials, school & college students, non-governmental organisations, and the general public.
The objectives of the game were set as guiding principles for its development and are as follows:
Creating general awareness about the SDGs and how they fall under various domains for developmental impact
Understanding linkages between the SDGs
Encouraging a collaborative way of working for better developmental impact
Improved decision making guided by SDG performance indicators
Improve awareness on how projects at the ward and city level impact overall SDG performance indicators
The game was developed and hosted on a website- http://sdggame.in/

Key words :
Gamification, Testing, Urban Development, Urban Governance

The Sustainable Development Goals (SDGs) are the deemed blueprint to achieve a better and more sustainable future for all because they address global challenges including poverty, inequality, climate change, environmental degradation, peace and justice. In other words, the SDGs are a universal call to action to end poverty, protect the planet and improve the lives and prospects of the global population. The 17 SDGs were adopted by all UN Member States in 2015, as part of the 2030 Agenda for Sustainable Development which set out a 15-year plan to achieve the goals. Current assessments around the world reveal that while progress is being made in many places, cumulatively, the action to meet the goals is not yet advancing at the speed or scale required.

The successful implementation of the SDGs, at its core, requires an unprecedented level of coordination, transparency and accountability across different levels of government. Despite the concerted efforts taken by state and non-state stakeholders, the awareness on the importance and relevance of SDGs for holistic and integrated development has still not fully percolated into the governance sphere.

Awareness precedes action and therefore much of the tepid performance of Indian cities in particular can be attributed to the low levels of awareness on how the SDGs can drive ongoing city development plans. Using SDGs as a framing device to tell the story of a state/ city will be crucial in compartmentalizing the ongoing efforts by the government for achieving the SDG targets by 2030. However, decoding SDGs can be demanding and overwhelming given the universal nature of the goals and the framework's interdependencies. Additionally, traditional methods to engage stakeholders are limited in scope and ill-suited for breaking down complex socio-institutional relationships. In order to ensure inclusive development, it is imperative to design effective methods to understand their aspirations, challenges and create avenues for co-creation. Such methods will further serve as means to achieve evidence informed knowledge sharing and democratisation of urban governance.

As a step in this direction, GIZ India and Urban Design Collective worked on an SDG gamification project in 2021. The SDG Gamification project was supported

by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) under the umbrella of Indo-German Development Cooperation and implemented in partnership with the Coimbatore City Municipal Corporation (CCMC). This online game is situated against the backdrop to improve awareness and to demonstrate how urban development projects impact the SDGs even at the level of local governments.

About the game

The game is designed for up to 6 players to be played across 10 rounds - each round signifying one year until 2030; the game is set to start from the year 2021. Players are assigned a hypothetical city with baseline indicators for all 17 SDGs for the year 2020. Players are given 60 crores every year/ round to be allocated to realizing a set of 22 projects as per their choice.

The set of 22 projects are designed to demonstrate linkages between multiple SDGs by showing varying percentages of impacts across different SDGs. Projects are distinguished by domain, variations in capital expenditure and operational expenditure ratios, and conventional projects versus projects with holistic impact, as a way to create awareness on project design for better impact. Players have to exercise prudence while choosing from this given list of 22 projects that they would like to fund and realise.

At the end of each round, a cumulative performance report is generated based on the collective performances of all the players. Players will be able to reflect on their individual performances and how this contributed to the overall city performance across all 17 SDGs. In subsequent rounds, players can choose to work together and/ or influence each other to collectively improve their city's overall performance. The game provides a mock experience of how choices of projects at a local level will impact the SDGs over the next 10 years. The target is to collectively achieve an improved performance for the city for all 17 SDGs by 2030.

Testing the game

Since its development, the game has been tested on multiple occasions with a diverse audience. In its launch workshop in Delhi in December 2021, the audience included ULB officials, Smart City officials from Tamil Nadu, Delhi, Karnataka, Madhya Pradesh, Assam and Orissa, and urban development practitioners from NITI Aayog and the National Institute of Urban Affairs. The game was tested in a large hall with the audience divided into six teams. The enthusiasm levels in the room reinforced the gamification approach to invoking a conversation about the SDGs. Groups developed their strategies for choosing and funding projects by the second round, and over subsequent rounds revisited their

strategies too with the realisation that they were not making adequate progress on the goals. Teamwork was enabled naturally as players realised that they needed to track several parameters and therefore assigned roles amongst themselves. But most of all, the game spurred spirited discussions amongst the team members as to how they could collectively fare better with each round while also finding the many hidden nuances that were layered in the game design itself. The session was wrapped up with a feedback session from the participants for further improvements to the game design keeping in line with the objectives of the game itself.

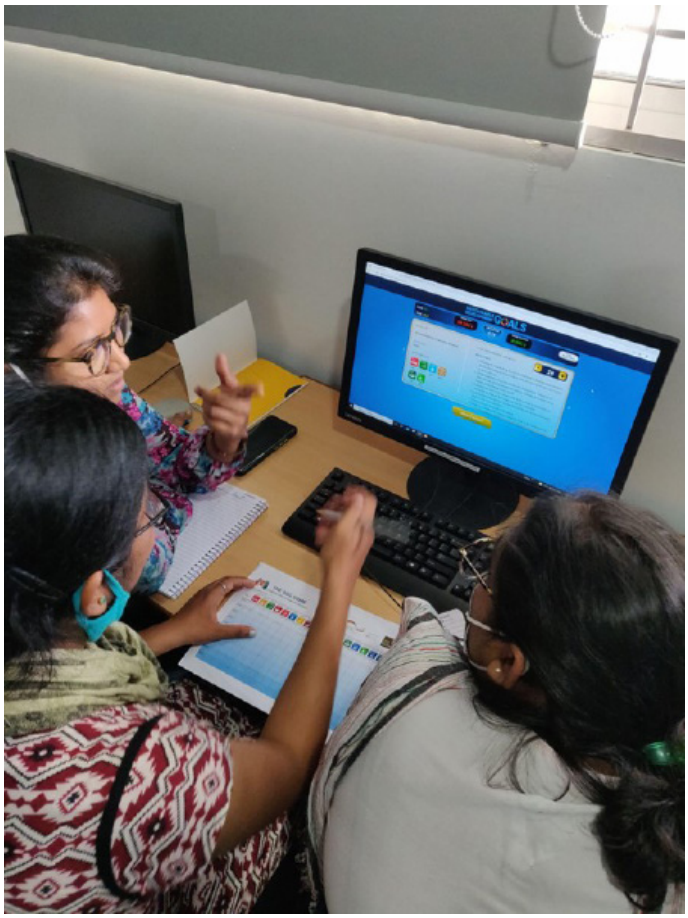
Another interesting session transpired when the game was played with students of the master's program in urban design at RV College of Architecture in Bangalore. This game session was conducted as part of the course titled 'Urban Governance and Project Finance' offered as a core subject under the master's program. The objective of this course is to introduce the mechanism of urban governance and fiscal foundations of urban development. In this context, the game served as a primer to municipal finance and the consequences of budgetary decision making using the SDGs as an evaluation metric.

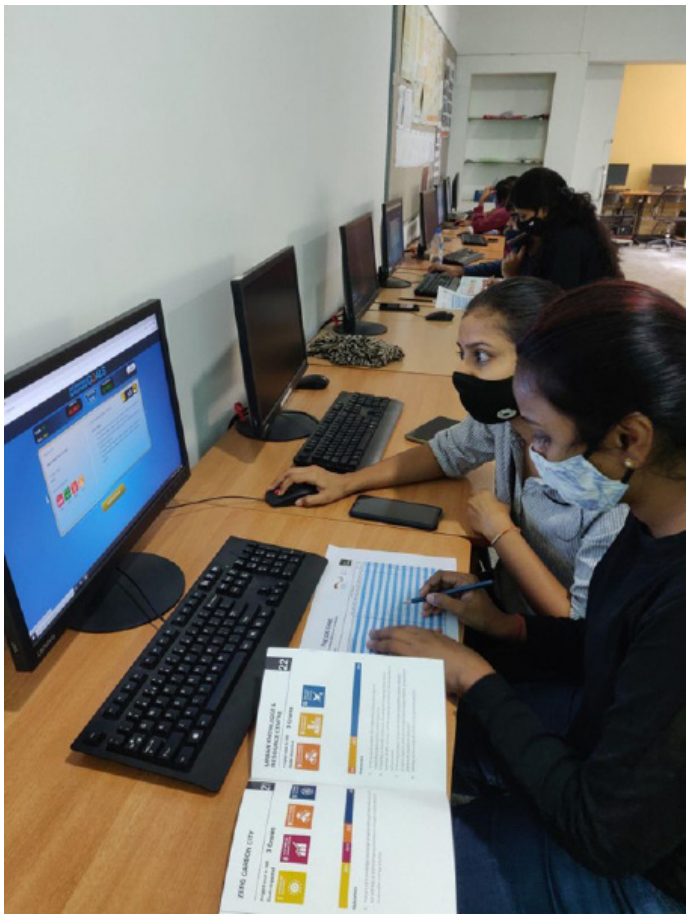
In conclusion

Cities are complex entities, and urban challenges are far more complex in the current day scenario. On the one hand, there is doubt on whether the SDGs as a universal standard for improving performance is even justified given the disparities in contexts. The idea of localising the SDGs has gained much momentum over the years as a way to enable local governments to embrace these metrics. Both the game sessions served as proof of the versatility of the game format to be used in various contexts and with various audiences to build awareness. Another reinforcement across both sessions was how everyone concurred on how we need more such tools to enliven the work that we all do with cities. Perhaps it's a sign to explore more such approaches to ensure that we are able to collectively move towards the desired future by 2030.

Acknowledgements

The game was designed by Vidhya Mohankumar and Srivardhan Rajalingam from Urban Design Collective collaboratively with Krishna Kumar from GIZ India. Game development and hosting is anchored by Anirudh Kasturi.





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Kalpa, Vol.03, 2022, pp. 43-45

Strategies for tempering urban floods in Indian cities

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Archana Vittal is an architect with a master's in Urban Design from CEPT University, Ahmedabad, India. She is currently an Assistant Professor at RV College of Architecture. She teaches architecture design studios, theories related to urban design at both the undergraduate and graduate level. Her area of interest is in urban studies, environmental psychology and urban conservation. She also has an architectural practice in Bangalore.

Abstract :
Bangalore, like many other cities in India, has been in the news for flooding in the eastern zones, causing damage to properties, severe traffic congestion and loss for IT companies in September 2022. Even earlier, water logging has been witnessed in many other parts of the city. Urban flooding is becoming more common in Indian cities in the recent decades. The most notable amongst them chronologically from 2000 to 2019 are Hyderabad, Ahmedabad, Delhi, Chennai, Mumbai, Surat, Kolkata, Jamshedpur, Delhi and Guwahati and Delhi, (Floods, n.d.) Jaipur in 2012, Chennai in 2015, Bangalore, Hyderabad, Gurugram in 2016 and Patna in 2019. From the above data, it is evident that it is not just the coastal cities or the metro cities, but many other tier II cities also are facing the challenges of urban floods.

Keywords :
Urban floods

1.Reasons for urban floods and measures to temper

According to Dr. Kapil Gupta, Professor, IIT Bombay, urban flooding is caused by three main factors: meteorological - heavy rainfall and storms; hydrological- high tides and human factors- changes in land use, sealing of surfaces, urban heat island (Gupta D. K., 2016). The causes of urban flooding may be different in different cities, but in recent decades, it is mainly due to human factors like construction on flood prone zones and deforestation for urbanization to name a few.

2.Increasing drainage capacity

The drainage capacity of Indian cities has not been able to keep up with urbanization and water supply. Indian cities need integrated planning with scientific data and technology that takes care of water supply and drainage into the urban planning process. (Gupta K. , 2005)

3.Removing and preventing encroachments on catchment areas

In the case of Bangalore, heavy encroachments on lake beds is an important reason for regular urban flooding. Also, storm water drains are not connected to water bodies. The city planning process has to respect and conserve these ecological features.

4.Increasing the porosity of urban surfaces

Urbanization is increasing the hard, non-porous urban surfaces which makes it impossible for storm water to soak inside the earth. Urban design measures, which include a combination of hard surfaces along with landscape planters along street and, using newer permeable urban materials will prove to be beneficial.

5.Policies for green spaces

In the absence of green policy, felling of trees for metro construction across cities, especially Bangalore and for the expansion of roads or for other construction purposes is becoming common. Strategies for increasing plantations like avenue planting (which Bangalore traditionally has) and cluster planting might help soak the excess rainwater.

6.Conserving large parks

We can all agree how environmentally beneficial the size and presence of Central Park (3.41 sq km), Sanjay Gandhi National Park(82 sq km) Maidan Garden (4 sq km) are for New York, Mumbai, and Kolkata respectively. The latter is under pressure for development from all sides (including proposals for construction of a road, underground tunnel, and ropeway).

Central Park in New York is highly competed land and has a lot of pressure for development, but political will and activism has saved it. The Conservancy model of Central Park is a great example of maintaining a public park with endowments from different agencies. Such models will help identify open spaces and parks as valuable economic resources as well, apart from being a valuable ecological resource.

Even though there is a lot of developmental pressure on green patches of land, or just vacant land, it is very important that cities conserve these natural spaces and work policies around maintaining them. Garden Cities of tomorrow may have failed on different accounts, but the inherent merit is that the larger city has a neighbouring countryside with open, green spaces that the city has access to, both for ecological and public functions.

7.Mitigating urban heat island and climate change through afforestation

In recent times, high intensity rainfall in a short duration (believed to be due to climate change), is causing flash floods in many Indian cities. As a long-term plan, cities may look at afforestation as one of the strategies to mitigate this. Some cities like Chennai are adopting the Miyawaki technique (planting indigenous trees in a dense manner about 60cm apart). Bangalore also started investing in Miyawaki forests from November 2018 on Hejjala, Mysore Road. 25 such forests have been created in Bangalore across various locations (Khanna, 2021). But critics argue that this technique might not be suitable for tropical foliage, because our natural forests are not very dense and our vegetation is not always tall and straight, but lusher and spreading.

Still, it is important that forests in urban areas must be protected, as they are a mirror to local geography, flora and fauna, and help to regulate local climate (Rao, 2021).

8.Sponge city concept of China

Proposed by Professor Kong Jian Yu in 2013, sponge city is a nature-based solution to make cities absorb and retain rainwater, preventing flooding and solving water problems. Qunli stormwater park in China is a successful example of a Sponge city and may be considered as a model for Indian cities.

9.Holistic planning

Urbanization should not be all about building. It has to be about unbuilding as well. A hierarchy must be followed for planning cities. To start with, conserving the natural regional settings should be regarded as the most important step and secondly, the heritage (tangible and intangible). Then, cities should also invest in the creation of adequate open spaces in the form of forests, stormwater parks, lakes, rivers, scrublands, streams, neighbourhood parks, playgrounds etc. (Goswami, 2020). After this, cities must accommodate the built, considering higher densities. Both long term (urban planning proposals with the vision of the city) and short-term planning (capacity building to accurately predict and manage

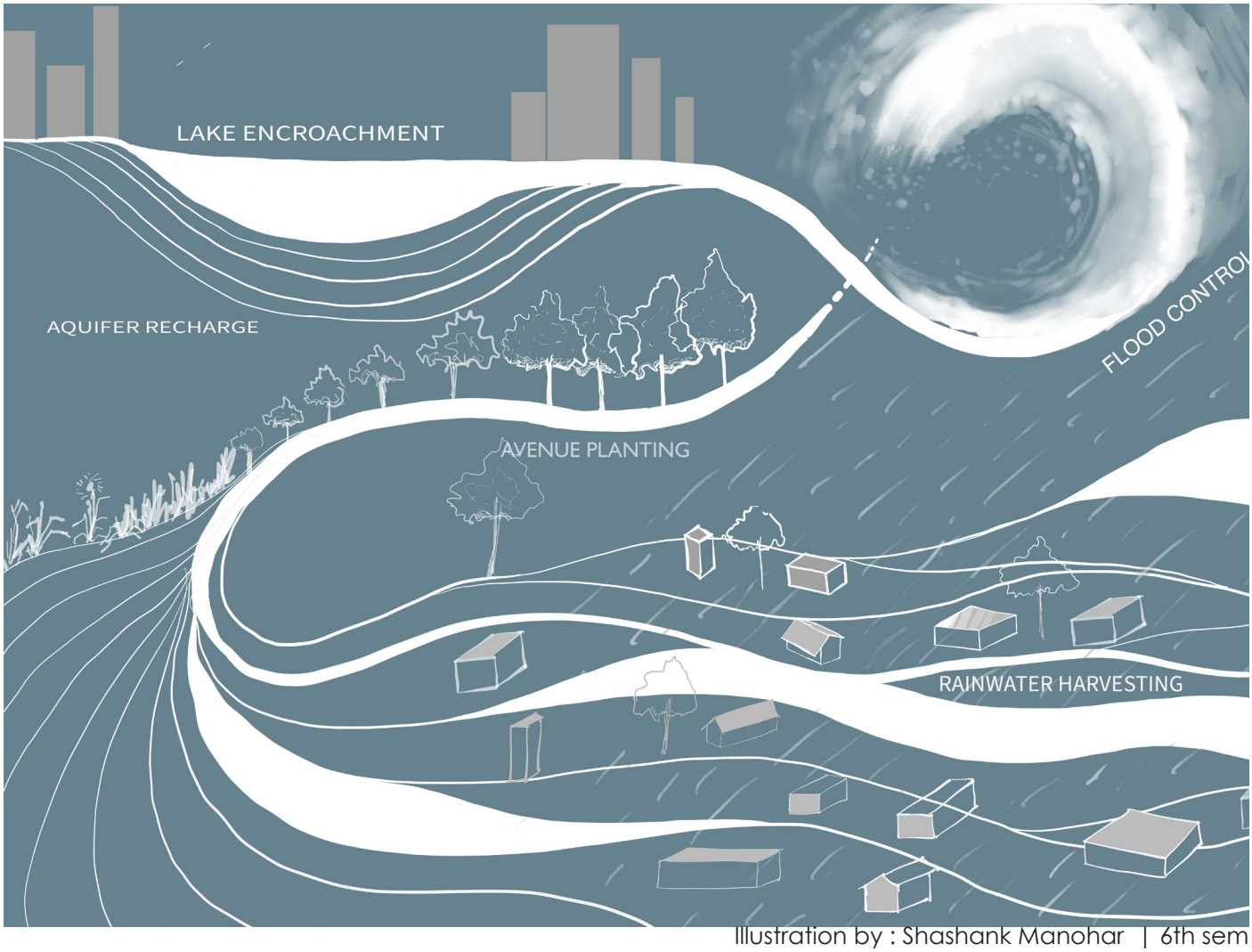

Illustration by : Shashank Manohar | 6th sem

disasters during the event of flooding) methods are required.

10.Importance of conservation of existing open spaces and creating new ones

Open spaces are as valuable as built because they not only offer clean fresh air and great public spaces, but help in storage of groundwater, control floods, moderate climate and help to abate air and water pollution. Hence, it possesses natural system value.

Many cities levy vacant land tax to reduce housing issues. Instead, cities may look at incentivizing such open spaces at the neighbourhood and city level. Problems must be treated at the unit and ward level. Making it part of the regulation that every ward must have stipulated amount of open space, with or without trees will help the absorption of excess rainwater, apart from its other benefits of creating public spaces. Rainwater harvesting is already incentivized both in Bangalore and Chennai, but implementation is poor.

11.Steps taken till now to mitigate urban flooding

Mumbai has a proposal of building eight pumping stations all over the city to pump excess water and to build underground tanks to store rainwater. But pumping is expensive for the short term, and ineffective because it depends on electricity which cannot be relied on especially during the monsoon (Gupta K. , 2005). Delhi is making its drainage master plan. Bangalore is planning to remove the encroachments on lake beds,but that is not enough. Year after year, more cities are experiencing flooding. This is the time for some action to prevent long term damage.

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Kalpa, Vol.03, 2022, pp. 46-48

Social Responsibility in the Light of Sustainability

Author : By Anushree Parkhi, RVCA Alumni

As architects we take pride in associating ourselves with sustainable and eco-friendly buildings. We highly regard the sustainable development goals and green- building rating systems. However, it is rare that we reflect on the meaning of 'Sustainability' in a complete sense. As defined by UNESCO, sustainability is "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." In a broader sense, 'Sustainability' does not merely mean 'being environmentally conscious'. It also includes economic viability and social responsibility. Unfortunately, the latter is commonly a forgotten aspect. This article elaborates on the 'Walk for Arcause' campaign in the light of social sustainability.

During the five years of our B. Arch program, we are exposed to the subject- 'Professional Practice', in which we are taught the types of offices and our roles and responsibilities as architects towards our clients. Surprisingly, we do not often discuss our responsibility to society as architects. At this juncture, I am prompted to wonder whether 'Professional responsibility' does not solicit 'Social Responsibility'.
As I ventured into the professional world, I chose to be a part of 'Ethos', an organisation headed by Ar. Gita Balakrishnan. When invited for an interview, I was asked if I had ever been interested or involved in any social service to the community. While I had been expecting questions related to my skills, experience, etc. this particular question left me perplexed and stupefied. Foraging for words, I could just recall a socially-relevant project in my school days. It was this instance that really made me ponder and reconsider my responsibility to society.

There are numerous examples of cross-country walks that have been done for a cause. Some of these examples include Srishti Bakshi's 3800 walk from Kanyakumari to Kashmir for Women empowerment, which eventually led to the start of the WOMB foundation. While I am sure there are many such examples of cross-country walks, there seem to be no past references of a cross-country walk for Architecture and Design. Being a part of the design fraternity, we all realise and proudly acknowledge the significant role that design plays in our lives and how it can transform our living. Design and Architecture are not merely professions, but indeed a way of life. We understand that small design changes and interventions can have large impacts. However, it is not that very often that we take the responsibility to reach out to people and make them understand the role of design and its importance.

It was some of these thoughts that sparked Ar. Gita to do a cross-country walk and definitely for the cause of architecture. The Walk for Arcause campaign was a 1700-kilometre, 70-day long journey, from Kolkata to Delhi, across 7 states, 849 cities, villages and towns. The 2,550,000 step journey reached over 2000 people on the walk and many more digitally.

The main cause the walk aligns itself to is to spread awareness on the importance of design and architecture and the importance of architects and designers in nation-building. As India celebrates its 75th year of Independence, the walk highlighted the importance of architects in society and also made them realise their responsibility towards society.

As an Explorer at Ethos, I had the good fortune of working closely on the 'Walk for Arcause' campaign. Each day of the walk brought with it a new story and a new learning that left me amazed, yearning to learn more. It included conversations with people from various walks of life such as women from villages, tribals, construction labourers, children, disabled people, other travelers on the street and, of course, architects.

Photo 1: On the Walk for Arcause campaign (Photo courtesy Ethos Foundation)

Photo 2: On the Walk for Arcause campaign (Photo courtesy Ethos Foundation)

As India moves forward to a major goal, a possible challenge for the country is its 'Sustainable Development'. A common point of reference while talking of Sustainable development are the sustainable development goals laid forth by the United Nations, also known as the SDGs. These 17 goals provide a framework for sustainable development. Although they do not directly address social responsibility, they highlight the issues in various spectrums of life that are in turn linked with social development and hence sustainable development. Reflecting back to the Walk for Arcause campaign, I found a strong connect between some of the goals set forth by the UN and a few actions or activities done as a part of the campaign. I believe this connection indicates and outlines our role as architects in the social realm and eventually in the larger realm of sustainable development. The article further describes this interrelatedness between the campaign and the SDGs.

Fundamentally, the first goal of the United Nations 'No Poverty', refers to the eradication of poverty and establishment of equality. One may wonder how this is relevant in the architectural realm. To put it simply, architects and construction workers are connected through a common building that they work on. These are the hands that bring to life the architect's dream. They translate lines on the paper to brick and stone, and yet many of us, architects in India, barely know the hands that bring our drawings to life. The Flag Off for the 'Walk for Arcause' campaign also marked the presence of two such construction labourers and craftsmen- Prasanta and Vijay. Prasanta learnt the skill from his father and he has been working as a carpenter for the last 20 years. He does not want his son to be a carpenter and instead encourages him to pursue Mathematics. The pandemic has been very hard for him and finally he is seeing a ray of hope. Vijay on the other hand, is a mason and both his children are pursuing Computer Science. The pandemic forced him to go back to his village as he lost his job and had to wait for another. There are many such labourers and craftsmen who have similar stories to tell.

On the other hand, there are many architects who do not know the names or faces of the labourers on their construction sites. Prasanta and Vijay were a hard find, as we at Ethos were on the search for construction workers for the flag-off event. Finding a woman worker was even harder, because Kolkata did not have many. While the reason remains unknown, Goal 5 of the SDG, Gender Equality, is put under question. Many of the architects we spoke to said that they had to ask the contractors about the construction workers on site. Thinking along these lines, I wonder that even though we as architects do visit sites to check if the construction is in order with the proposed plans, etc., it is very rare that we have empathetic conversations with the construction labourers at site. In one of our casual conversations, Ar. Gita described to me the times when she would sit and have lunch with the labourers at site. I was left wondering about the possibilities of that today.

On the 'Walk for Arcause', we definitely did realise that many architects are not aware of the construction workers on their site. Conversely, Ar. Gita also noticed that many construction workers do not know who an 'Architect' is. Frequently people

Photo 3: Construction Workers during the Flag-Off for the walkfor Arcause campaign
(Photo courtesy Ethos Foundation)

did not know the term 'Architect' or 'Vaastukaar' or any related term in local languages. When asked 'Makaan kaun banata hai?', translated to 'Who builds a house', people often answered 'Engineer'. While Ar. Gita travelled from Kolkata to Delhi, this scenario only became more familiar. The link between architects and Construction workers thus appears more broken than ever, with both sides being equally unaware of each other's existence.

As mentioned in Subhomay Saha, 2021, according to a survey conducted by the NSSO in 2016-17, the number of construction workers in India are estimated to be around 74 million. According to, Re-thinking the future, n.d. "As of 2019, there are over 90,000 CoA-registered Architecture firms/ architects in India, practising independently or with other architects, engineers and developers co-creating the environment that we all share." Moreover, as per an article in City, 2018, there are over 400 Architecture schools in India that produce around 24000 graduates per year. Considering the number of architects, fresh architects and construction workers, the ratio of architects to construction workers is 1:8, which is a relatively small ratio compared to the average social network of a human being. So, if each architect was to support eight construction workers, then our fraternity could be more socially aware and definitely more responsible.

As young architects or fresh interns, we always feared that we would be assigned the task of toilet design for months. While it does sound boring to keep working on the design of a toilet for months of training, no one other than architects knows how daunting this task can get. Yet with all this knowledge, experience and expertise very few architects actively engage themselves in missions similar to the Swachh Bharat Abhiyan. Referring back to 'Goal-6' of the SDG: This goal mentions the importance of clean sanitation. In India, the Swachh Bharat Abhiyan is a key mission that addresses the requirement for construction of toilets.

Under this mission, sanitation and related infrastructure was developed in many Indian villages. According to the Public information Bureau, 2019, there are over 9.5 Crore toilets built in India since the inception of the Swachh Bharat mission. However, getting these toilets constructed has been a real struggle.

Photo 4: On the Walk for Arcause campaign (Photo courtesy Ethos Foundation)

A large part of the Walk for Arcause journey involved passing through highways and rural areas, and toilets were a big challenge in both scenarios. While highways often lack this facility, bringing this concept to rural areas is another challenge altogether. A glimpse of this struggle was expressed by Sunita Devi, a lady Ar. Gita met in a village on the journey. Popularly known as 'Rani Mistry', translated to 'Queen Mason', Sunita Devi is a woman of might. A non-architect, leader by example, who learnt from male masons in the village how to construct toilets and then worked to empower women by teaching them how to construct toilets. She taught them how to get the slope right, how to make sure that the soak pit is correctly located, etc. The conversation of Ar. Gita Balakrishnan with Rani Mistry, made me think hard, "If common people can work so hard to learn how one designs toilets, why can't we as architects, take a step, go ahead and reach out to people?"

Working for monetary benefits is definitely a need for survival, but I believe that working for social causes elevates your life. Personally, working for the Walk for Arcause has been an eye-opener for me and hopefully for many other architects and others in the architecture and design fraternity. I sincerely hope that moving ahead, we as young architects, the future nation-builders, take ahead the intent of this mission and do not leave it buried in history. I hope that we strive to be a little more socially responsible and in this way, more sustainable.

Photo 5: Ar. Gita inconversation with Rani Mistry (Photo courtesy Ethos Foundation)

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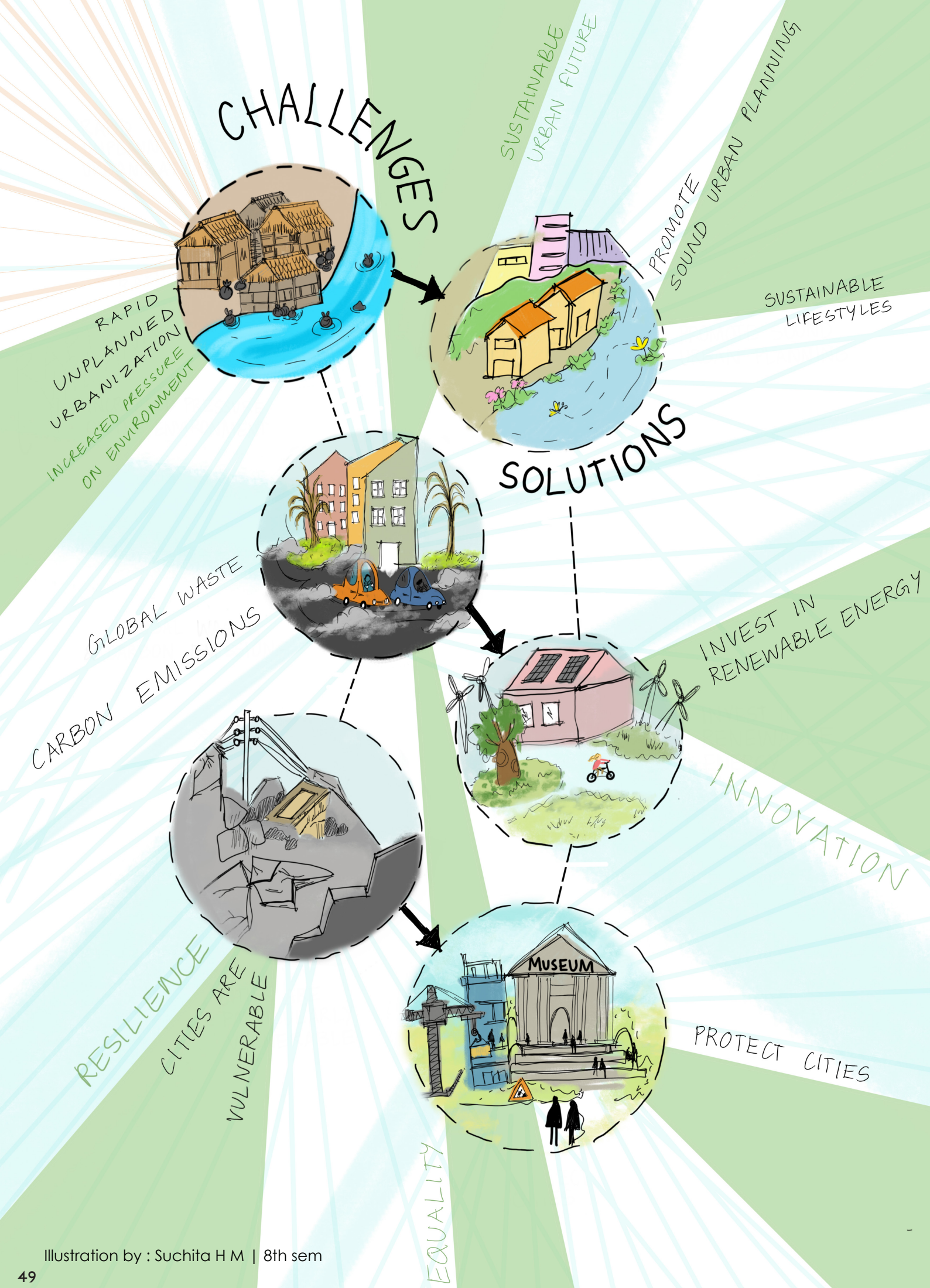

Illustration by : Suchita H M | 8th sem

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Kalpa, Vol.03, 2022, pp. 50-51

Sustainable Development Goals - Their role in Sustainable Urban Future

Author : Dr. Janmejoy Gupta, Ms. Namrata Dhobekar

Abstract:
The need for Sustainable Cities and Communities is a crying call for the future of the continuation of human settlements. Ideal city, according to goal 11, should be inclusive, safe, resilient, and sustainable. However, while succumbing to the demands of wanton urbanization, we should not ignore the cradles of our indigenous communities, whose timeless traditional knowledge in building resilient spaces have stood the test of time and may give vital pointers towards building sustainable cities of the future. To withstand the many threats our cities are facing now and would face in the future, it is imperative to incorporate the Sustainable Development Goals (SDGs) set by the UN which reflect the same. These cities and communities promote social, gender as well as economic equality at all levels and indicate a clear intent to protect cities today and push them towards sustainable growth amidst the rising uncertainties, to build healthy and liveable built environments. The Sustainable Development Goals, the 2030 agenda for sustainable development, adopted by all the United Nations Member States in 2015 is described as a "plan of action for people, planet and prosperity" (UN, 2015).[1] It represents 17 thematic areas that cover the objectives of economic development, social inclusion, and environmental sustainability.

Keywords:
Urban Future, Sustainability, Resilience, Equality

Cities are dynamic machines in themselves creating a universe of their own, fuelled by continuous growth,the ambitions of people migrating to cities for a better life, and new horizons for millions who look for a better future in this era of globalisation. According to the UN, by 2050 half of the world population will be living in cities. The threat of urban sprawl and uncontrolled growth looms over the world. As a reaction, in 2015, all nations of the UN penned down a 17 goal blueprint (Sustainable Development Goals or SDGs) for the world to look up to — focusing on "improving health and education, reducing inequality, and spurring economic growth". Out of these 17 SDGs, six (6) are related to increasing urban sustainability, liveability and resilience. They are, starting with the primary Goal 11 - Sustainable cities and communities , and is in concurrence to some other goals, namely, Climate Change and Sustainable Cities and Communities [goal 13], Innovation, Industry, Infrastructure and Sustainable Cities and Communities [goal 9], Inclusive Societies and Sustainable Cities and Communities [goal 16], International Economic Parity and Sustainable Cities and Communities [goal 10], and, Gender Equality and Sustainable Cities and Communities [goal 5]. Here we discuss the role each of the SDGs mentioned in context to the role they can play in creating a more sustainable urban future.

We begin with Goal 11, Sustainable cities and communities, which directly addresses the relevance of cities and local governments in fighting poverty and achieving sustainable development by 2030. The quality of life in cities is intrinsically tied to how natural resources are managed and used. This goal aims at building resource efficient cities that combine productivity and innovation while promoting sustainable lifestyles within communities, thereby lowering social and economic losses as well as reducing environmental impacts. The goal targets providing safe, resilient and affordable housing and access to green public spaces for all, and protecting cultural and natural heritage. It seeks to enhance inclusive and sustainable urbanisation overall. Moreover, it aims1 to reduce the adverse per capita environmental impact of cities with specific focus on air quality, municipal and other waste management. One of the primary threats to Sustainable Cities is of course climate change, which is estimated to be to the extent of causing seas to gobble up major coastal areas globally including sizable parts of cities like Jakarta, Mumbai, Chennai and Calicut. So quite rightly, the UN addresses the same in SDG 13.

Goal 13, Climate change aims to take urgent action to combat climate change and its impacts. This goal targets to decrease greenhouse gas emissions, and plan low emission development pathways. [2] This can be achieved by building inclusive approaches to achieve political, economic, environmental and societal objectives related to climate change mitigation and adaptation. Local governments can promote comprehensive low emission development strategies, including plans for carbon neutral transportation systems, smart grid networks, and exploring green construction techniques in this context. Moreover, amendment of building codes, zoning bylaws, adoption of standards governing construction of buildings, and infrastructure that is more resilient to climate change risks can help achieve this goal. It can also target climate risks derived from a lack of basic infrastructure and amenities for

all, especially the poorest urban residents in the cities.

However in the midst of all this, development has to go on for the progress of nations and their citizens' well-being, so Goal 9 dealing with innovation/infrastructure, industry and innovation, is what we overview next.

Goal 9, infrastructure, industry and innovation, aims to build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. City or spatial planning and design define the conditions for infrastructure and can trigger technological and social innovation. Infrastructure and industrialization gaps are growing between and within cities. Flourishing areas with ample green spaces coexist beside severely deprived neighbourhoods with inadequate housing, scarce services, and infrastructure. The focus of this goal is to increase resilience through an optimal mix of green, blue and gray infrastructure and an adaptable design that anticipates potential shocks and stresses. Cradle-to-cradle construction (full life cycle planning) is promoted to increase the sustainability of infrastructure and buildings. The objectives of this goal include promoting education, knowledge-sharing, scientific research for sustainable business practices, and planning and implementing local policies for disaster risk prevention. By 2030, this aims to upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies. [3]

The afore-mentioned SDGs do not stand a chance of any meaningful impact unless socially and economically equal, inclusive, strong societies with strong institutional support are created, and that is what the next three SDGs outlined, namely, SDG 16,10 and 5 shall highlight.

Goal 16, Inclusive societies/ peace, justice and strong institutions aim to build effective, responsible, and inclusive institutions at all levels to ensure access to justice for all. Cities provide a wide range of capacity-building possibilities at all levels of the government, as well as forums for conversation and democratic decision-making. In urban areas, peace and integration are intrinsically linked to the transparency and accountability of local governments and institutions. Inclusive spatial planning and urban design accompanied by effective local institutions, are important frameworks for a peaceful society. Conflict-stricken areas demand urgent local actions and resources to relieve affected populations and mediate further conflict. Eventually, this can result in sustainable regeneration of deprived communities. This goal directs towards building safe and peaceful living environments and targets socially deprived neighbourhoods in reducing violence and conflicts. It also identifies new forms of participatory decision-making which has been demonstrated as an effective strategy towards sustainable growth of cities. [4]

Goal 10, International economic parity / reduced inequalities, aims to reduce inequality within and among countries. The income distribution between regions is greatly affected by the distribution of cities and rural areas. The majority of today's inequalities, on the other hand, are the product of poor economic development and planning, as well as uncontrolled urbanisation. Poorly managed urban processes can widen economic gaps between people and create even more inequality and social fragmentation, rather than significantly reducing poverty. Inclusiveness, universality and sustainability of economic development will have to address this problem. Such initiatives can target human settlement planning that distributes new arriving dwellers, while maintaining social cohesion. [5]

Goal 5, Gender equality, recognizes that gender equality is a critical element in achieving sustainable development. It aims at ending discrimination and violence against women and ensuring that they have equal opportunities in life that men have. Cities offer opportunities for social, economic, cultural and political participation that facilitate gender empowerment. Yet, due to the prevalence of gender inequalities, women and girls often benefit less from urbanization and urban spaces, often based on discriminatory grounds over which they have little or no control. In illegal settlements, where levels of vulnerability disproportionately affect women, youth, and children, these inequalities are particularly pronounced. Addressing such issues in cities has a direct impact on breaking vicious circles of social exclusion. This goal can encourage local governments to enhance responsive urban planning, smart and mixed use of land and public places that are geared equally towards both genders and includes all age groups.

Thus, even though all the afore-discussed SDGs have a few overlapping components, all are contributing to the common goal of a sustainable as well as resilient urban future. In the coming decades, urbanization rate would increase manifold, thus it is more imperative for a sustainable and resilient future. Sustainability and Resilience of cities is possible only when social as well as economic equality exists in an inclusive society, which does not differentiate on the basis of caste, creed, sex, region, religion, etc. So in a way, the United Nations has created a holistic framework to guide efforts towards a sustainable urban future. An ideal city, according to goal 11, should be Inclusive, Safe, Resilient, and Sustainable. Although this is true, the pandemic has reinforced the need for cities to be socially, economically inclusive and equitable in all respects. It's imperative that decision makers and urban planners realize the same and start implementing sustainable principles in future cities they help mold.

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Vertical cities: A sought out future?

Author : Arunima Badrinath | Sphurti Purohit, M.Arch, 3rd semester

Abstract:
At present, there is a total of one hundred and fifty million square kilometers of land available on the Earth's surface. This area of land is inhabited by approximately seven billion and eight hundred million people. These statistics indicate the world's population density, which measures approximately 59.27 per sq.km[1]. In other words, every square kilometer of land on Earth is occupied by an average of 59.27 humans, at any given point of time. Just 50 years ago, this value was 28.57 per sq.km[1]. In another 50 years, the world population density is predicted to be 76.77 per sq.km[1]. Although these numbers sound like complex jargon, what they mean is fairly simple. It means that while population increases exponentially over time, the surface of land on Earth will more or less remain constant. This is the context in which place-makers find themselves today. With more and more people migrating to cities every year[2], the discussion around Urban space shortage and efficient city-building is all the more relevant.
Over the years, architects, planners, designers, urban enthusiasts, scientists and academicians have dedicated their time and resources to this cause. Several projects have been attempted to overcome the shortage of Urban space, such as the creation of artificial islands, as in the case of Palm Islands in Dubai. Other projects that have been proposed include 'Above Below'(Matthew Fromboluti, 2010), a subterranean skyscraper in Arizona; and the 'The Gyre' (by the architectural firm Zigloo), a subaquatic "seascraper". However, no solution has been discussed, debated and promoted as the "Vertical City".

Keywords:
Population Density, Vertical Cities, Public Spaces, Global, Planning

Introduction

Ever since the advent of the skyscraper in American cities such as Chicago and New York in the late 19th and 20th centuries, there has been no looking back. Cities worldwide have looked skywards for a solution to problems of overcrowding, congestion, land shortage and overpopulation. It seems to be less complicated and more economical to build skyscrapers than to create new cities through the reclamation of land and water.

In its essence, 'Vertical City' refers to an entire human ecosystem that is contained in one or more massive skyscrapers. One of the early ambitious Vertical City proposals was that of the 'Contemporary City' of three million Inhabitants by the famous Swiss-French architect, Le Corbusier in 1922. It was designed to accommodate six times the population of Central Paris at the time. The central part of the site was reserved for twenty-four skyscrapers, each measuring an area of about 190m x 190m, and a height of over 200m. These buildings were to function as hotels and business centers, and were surrounded by residential districts that would provide accommodation for the people who worked in the skyscrapers. The entire built-up area of the 'Contemporary City' accounted for just 15% of the site area, and the rest of it was designated for gardens and open spaces. A three dimensional rendering of this proposal has been depicted below.

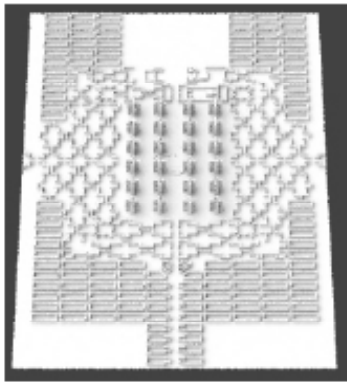

Fig 1: 3D rendering of Contemporary City (Source: "La Ville Radieuse" by Le Corbusier once again a case study, Marylene Montavon et al.)

Corbusier envisioned this city as a 'living machine' which organized the business district, the residential district, the transportation core and the high street shopping area in a Cartesian manner, as demonstrated in Fig 2. However, this project was never realized, due to the lack of financial support from the business sector at the time.

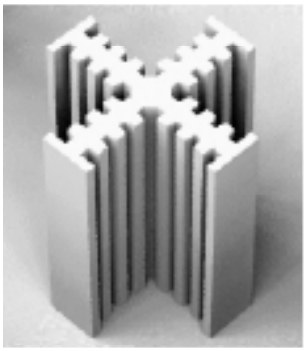

Fig2: 3D rendering of skyscraper (Source: "La Ville Radieuse" by Le Corbusier once again a case study, Marylene Montavon et al.)

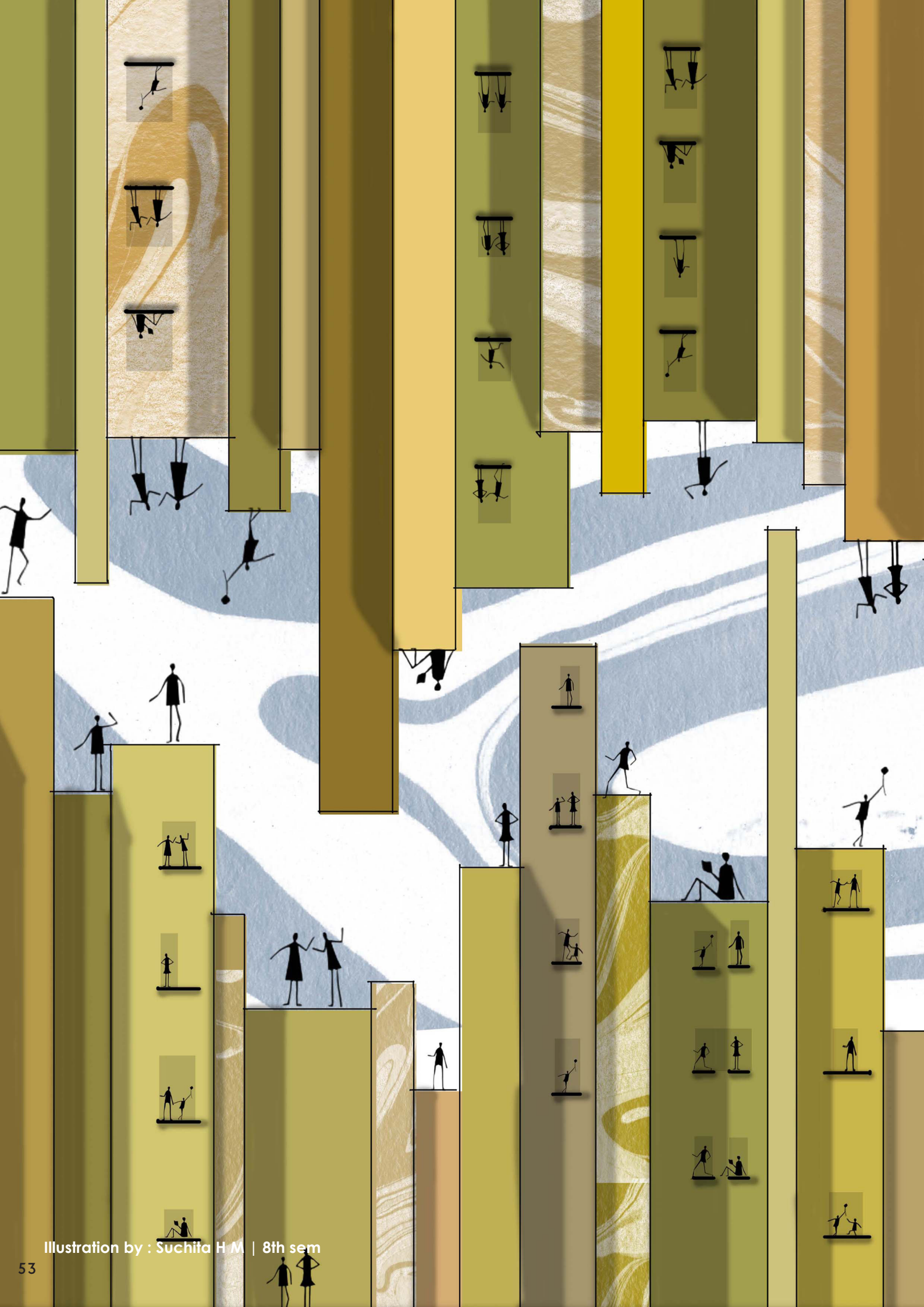

Illustration by : Suchita H M | 8th sem

This proposal was followed by several futuristic hypothetical studies that integrated technology with Vertical City, such as 'A Walking City', 'Living Pod', 'Plug-In City' and 'Instant City' by Archigram in the 1960's. These projects were not considered practical and economical enough to implement. However, some successful and ongoing attempts at Vertical Cities in recent years include the city of Hong Kong, The Raffles City in Singapore, and The Line in Saudi Arabia.

The Indian Context: Mumbai City

As of 2022, the population density of India is 431.11 people per square kilometer[1]. The city of Mumbai, in particular, has a density of 19,652 people per sq.km[3]. This makes Mumbai one of the most densely populated cities not just in India, but in the world. There are 237 buildings taller than a 100 meters in Mumbai, which puts the city on the league of having a vast number of skyscrapers; comparable to Shanghai and New York, which have 327 and 855 such buildings respectively.
In the paper titled 'Urban Layouts, Densities and the Quality of Urban Life' by Shirish B Patel et.al 2007, the authors observe that although Mumbai is often compared to New York by politicians, the context of the two and their requirements of floor space per capita cannot be compared.

The paper comments on urban planning in Mumbai, and the tools employed by the government of Maharashtra in the planning of the city. The article mainly focuses on three tools, namely; Buildable Plot Ratio (BPR), Floor space index (FSI), Public ground area (PGA), and Built up area (BUA).

The types of spaces that have been considered for the study have been listed below.
a) Private space, which includes home, family, and shared private space with neighbours.
b) Public space refers to those spaces which are shared by the wider public; people who aren't necessarily related. These may include open spaces, built spaces, pedestrian and bicycle spaces etc.
c) Arterial transport spaces refer to the transport arteries of the city, railway tracks and stations, expressways and arterial roads and bus ways.

The article proceeds to draw parallels between cities such as Mumbai, Delhi, Manhattan and Shanghai. For instance, the Built-Up Area (BUA) for residential and commercial buildings in Mumbai is within the range of 7.5sqm per resident per job. The lowest value is about 5sqm per resident per job. The BUA for slums is about 1sqm/capita on an average while in Manhattan it is 63.7sqm/capita, nearly 9 times the average of Mumbai.

Public spaces include spaces for common amenities, recreation and foot paths, roads and public parking. These spaces are together called PGA. The international norm for community spaces is 4 acres per 1000 population, that is, 16sqm of PGA per person. The PGA in other cities like Shanghai and Manhattan is much greater than that in Mumbai. It is observed that when politicians envision Mumbai on the same terms as Shanghai, they do not consider the amount of public areas that are available in the latter. Instead, they suggest an increase in FSI, which will reduce PGA and make the outdoor living environment much worse than its present condition.

The authors also reflect on the densities of the locality, both gross and global. For example, if a building of 1 hectare of buildable plot accommodates 2000 people at 5sqm/person, they would require a built up area of 10,000sqm. This gives an FSI of 1, which can be achieved in a G+2 height building, provided that 1/3rd of the land is occupied. If this is compared with the standard density of 65sqm/person as required in Manhattan, we would require 1,33,000sqm BUA. This would imply a building of 40 floors and a higher FSI. Thus, a higher PGA per capita requires a reduction in BPR. As density increases, the BPR will further reduce, and more FSI will be required to accommodate the population. At this rate, the future of Mumbai as a Vertical City is a huge possibility in the near future.

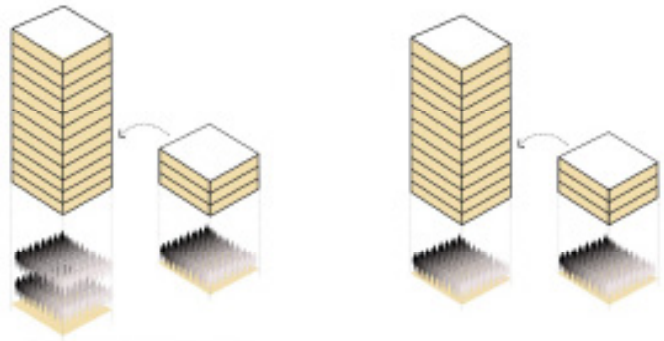

Fig3: The relationship between vertical growth and density of population

The two instances represented in Fig.3 represent the relationship between vertical growth and density in the context of Mumbai. The first instance depicts an ideal situation, wherein vertical growth must lead to a decrease in density and an increase in space per person. However, in reality, vertical growth is leading to an increased density and a decrease in space per person, due to the negligence of PGA and gross density.

Conclusion

One of the aspects of Vertical City that is slowly gaining traction is that of vertical farming or vertical gardening. Fig 4 represents two instances that help explain the relationship between the height of the building and the availability of green open space. It is observed that the low rise building with high density in the first instance seems to make more allowance for green space than the high-rise building with high density in the second instance. This contradicts the idea of vertical gardening as a solution to the increasing density and decreasing land parcels in cities.

Thus, the implementation of 'Vertical City' as a concept continues to be a complex process today. This is mainly because of the multitude of contextual and regulatory parameters that are to be considered in its design, some of which have been mentioned above. It also requires enormous financial and political support from the public as well as private agencies. In conclusion, the goal of the 'Vertical City' must not only be to minimize our intervention in the natural environment, but also to provide a healthy living environment for city dwellers.

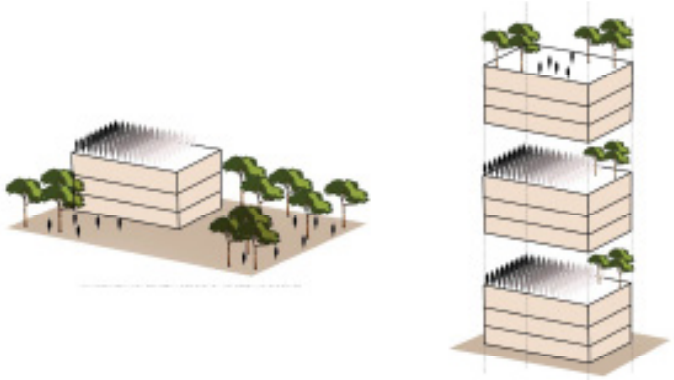

Fig4: The relationship between the height of the building and availability of green space

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From Buildings to Cities

An Interview with Ar. Minni Sastry
Date of Interview : 08-11-2022

Ar. Minni Sastry is a Green Building Professional with over 18 years of experience in designing climate responsive built environments, certifying buildings, applied research, and developing policy framework for cities to mainstream Sustainable Development.
As a Consultant to IFC, she worked with the Global team, to develop high level low carbon growth initiatives for targeted cities in India. Managed projects with Government of India, State Governments, US Department of State, Multilateral organizations, UNEP, IFC, Educational Institutions, Department of Science & Technology, Corporates & PSUs in India. She is currently pursuing a part time Ph.D. Her Research topic is "Development of Evaluation Tool for Green Built Environment to Control Increase of City Temperatures and Climate Change". She teaches Sustainable Building Design at R V College of Architecture, Bengaluru.
She Co-authored, with Ms. Mili Majumdar, the book "Green Homes and Workplaces", published by TERI Alumni Association,2022.

Could you tell us a little bit about your education and your interests in the field of architecture?

I completed my B.Arch in 2002, where I think I was one of the few people at that time who had a questioning mind about 'What is right, What is wrong and What is the truth behind building science?' At that time there were a lot of curtain-glazed buildings, and my dissertation was on glass buildings and their energy efficiency. I had the question of whether glass buildings are good for us and what is the kind of right architecture. I did my master's in AA School of Architecture in London because at that time I can't remember any master's program in India which was giving a master's in Sustainable Building design.

Also, I was looking at tools which could equip me to analyse buildings, which was also not so common here back then. So, I did my master's, which was on Environment and Energy studies and that is when I started analysing buildings for thermal comfort and visual comfort and doing energy simulations.

You used to work at The Energy and Resources Institute TERI, could you tell us a little bit about TERI and your experiences there?

I came back to India in 2003, after which I joined TERI, and I was with them for 15 years. I had initially joined TERI, Delhi for 2 years. In those days, TERI was involved in certification of New Buildings under the US Green Building Council, LEED. However, after a few buildings the team in TERI, then known as, Centre for Research on Sustainable Building Science, developed a green building certification for Indian construction industry, climate zones and lifestyle. I was a part of this team. We developed GRIHA (Green Rating for Integrated Habitat Assessment) to address the environment issues related to the built environment of our country. GRIHA is now the National Rating System of India.

Your work on a green home solution for sericulture farmers was very inspiring. Could you tell us about it and about any other innovations and ideas you have worked towards?

In 2007, I got married and that's when I took the transfer to Bangalore. I started a group for building science here. In the initial years, I worked with Bangalore Development Authority and BBMP, and I used to write proposals which were single handedly done. Now there's a team but initially, I was the only one. So, I used to work with these development authorities and try to see if we can change the building bylaws or create some policies so that Energy Efficient assistant ability becomes a part and parcel of construction. Those were the initial projects at the grassroots level.

In TERI, we got some funding from the central government, and we had to look at the rural areas, because of climate change and the impact it had on various sectors of agriculture. Building science also plays a role there, because sericulture or silkworm rearing happens in a silkworm-rearing house now. Due to the changing climate, the homes are becoming hotter, and the yield had reduced. As you know, South India, along with Bengal, is one of the highest producers of silk in the country because of comfortable climate conditions. But with the change in climate, increasing temperatures, humidity, and everything else, there has been a drop in the yield. So, the whole project was to design a passive house for

silkworm rearing for the farmers in South India, so that those comfortable temperatures could be achieved inside through passive features.

We had partnered with Sanjay Mohe's office for the construction. In TERI, we had designed the passive house and simulated it for various passive features which had all those basics, the true north-south, very few windows, along with several natural ventilation techniques which we had integrated. For example, stack effect, shading, and insulation. It was good because we had simulated beforehand. That's the tool which I want to say that all architects should have. You should be able to analyze the design before it is constructed, to understand what the indoor environmental conditions are, whether they are comfortable or not. Due to the tools that I knew at that time, I was able to model, so I designed the house and of course, Mohe's team got it constructed, but I also modelled it to understand, and it was nice to see that when the house had gotten constructed and was monitored, the results were very similar to what we had predicted using simulations at the design stage. That's one of the advantages of being well-equipped with simulation tools.

What are the living conditions of the people in the places you worked in? How do you think your work can help with their living conditions? Can you also tell us about your experiences with the local people in the places you have worked in?

We used to work at the grassroot level with farmers and then with GRIHA we also started working in the affordable housing sector in TERI. That is when the team also grew, and we expanded. We got several projects from the World Bank and from the United Nations where we were also designing and providing spaces to local people for climate-independent housing. There were projects that we did in the Uttarakhand area which is known for earthquakes and some other projects that we had done in Bangladesh that come under this.

We also developed a prototype for cyclones, and we had done a prototype in Nepal, along with a housing module. In the affordable housing sector, we started doing a lot of surveys where we would go and understand the condition of people living in the rural segment of the population. If you do surveys in these communities which are already constructed by our development authorities, there would be severe issues of indoor air quality because of the lack of right openings and daylight along with storm water. Three very basic issues. We started developing our affordable housing sector through sustainable measures.

After TERI, you worked with the World Bank. Could you tell us about the project you worked on with them?

During COVID times, it was tough for me to travel to TERI. So I resigned because I got an opportunity to work at the city level with the World Bank. The World Bank has developed some similar tools for cities, like what we already have for buildings. It's not like a certification system, but it's a tool which can tell how sustainable a city is and in the years down the line till 2030 or 2050, how city-level GHG Emission reductions can happen. They were looking for a consultant who can work in India for 14 cities for which I helped them in their tool analysis by collecting the data from local consultants for 14 cities, and we analysed 'how are the current trends, how GHG emissions will further increase in the current scenario' and so on.

The four sectors that we looked at were the built environment and energy, transport, water, and solid waste. But all the 4 sectors are looked at on a city level. For example, more than 90% of the solid waste which may be segregated but not scientifically treated in the country yet becomes a part of GHG emissions in the city. We had looked at more than 20-25 measures across these four sectors and what would happen if these were implemented. For example, if public transport goes EV, then what is the GHG emission reduction? So, this took me from the building level to the city level and based upon that work, I was already given an idea as to what more needs to be done at the city level. That is when I started my Ph.D. work and that is where I stand now.

Could you tell us a little bit about the topic you are researching for your Ph.D.?

I'm going to develop a tool where we can analyse some of the green measures and the impact of green measures to further decrease the city's air temperature. We have the two degrees Celsius Thumb rule or Benchmark that has been given. I have taken Bhopal as a composite climate and Bangalore as a moderate climate, and I have narrowed down my Ph.D. research to 4/5 elements which would include transport, for example.

Basically, in transport, I would be looking at how to reduce anthropogenic heat so that my city's temperatures don't increase. That's the algorithm or tool that I'm going to develop at the city scale. Or for example, if 50% or 70% of the roofs, and roofscapes turn into cool roofs, then what impact would it have on further reducing the increase of the temperatures? The temperatures have been increasing, which is the cause for more energy consumption and it's a vicious cycle. To break that, I'm developing this tool.

Can you tell us about your work with the World Bank and if it influenced your decision to take up this as your Ph.D. topic?

Before I worked with the World Bank, it had not been there on my mind. But when I was working for them, I saw that all major companies, whether it is C40 or whether it is the World Bank Sustainable Cities program were not just looking at GHG Emissions. GHG emissions are important, but ultimately for climate change, we must also look at how we reduce this increase in temperatures. But ultimately, of course, that conclusion is not happening.

I want to fill that gap by developing this tool and see that there's enough from various of these measures. How do you translate it into reducing climate change in terms of city temperatures? That's the gap which I felt is there currently. That's what motivated me to get into this tool.

You have spoken about working with the government on a few projects. Have you also worked with the private sector or private clients?

In the private sector, the interactions that we've had is because they are developing campuses and new buildings. There are two ways to deal with the public sector. One is on a policy level, but the other is through their campuses and buildings. For example, Power Grid Corporation of India which is a PSU, or HAL, has developed residential campuses as well as headquarters and office buildings, and these were developed as super-efficient buildings and are highly certified in terms of five-star or Platinum in LEED. That is where we used to work with the PSU as well as for the corporate sector.

ITC is another company, where they wish all their buildings to be sustainable and green certified. We used to do all their simulations as green building consultants and used to optimize their water demand, waste management, architectural design, and so on. From the green perspective, energy efficiency also facilitates the certifications as to whether it is IGBC or GRIHA. So we used to work with the corporate world, and give them green building consultancy. That's the most important part. TERI was different from any other green building consultancy because it's not for profit which I've always liked. It's a research institute, so the green building consultancy also was very research-based and because we were a Research Institute and an NGO, we were never biased. We would give them an unbiased solution.

Our measures and our recommendations were always research-based, and we used to give green building consultancy and then it depended on the client whether they would go for certification or not. If not, we would just do a green building consultancy where we would deal with all those sectors. We would optimize the landscape plans, and site development so that everything from outside to inside, all the services were optimized for sustainability, and everything would be taken into consideration. Then we would ask them if they wanted to go for certification, and we would go forward and facilitate those documents as well. That is a role that as green building consultants or researchers we play.

How do you think the design of a space can help make it more inclusive for the community?

I think firstly, designing right can always make it inclusive, I would say. If it's at a city or a neighbourhood level, I think it's very important that the designers do what is ethically right and truthful justice to what they're designing for. So, if it is a campus on a neighbourhood level, it is important that from both a health as well as an environmental perspective, it has to be approachable for people to walk and reach everywhere. When you see the word holistic, I think it's very important that it is for the people for whom you are designing.

People must be kept in mind. If walking helps, if air quality helps, if water quality helps then how do you design these systems around them so that you're taking into consideration their better health and the better environment? Safety will also go hand in hand with that and ultimately one tries to see that they have minimum or least impact on the environment with respect to whatever development they are doing, whether it is for a city or a satellite town, or a small institutional campus.

It's very important that we also understand that when we have a parcel of land, what is the capacity of this land in terms of the number of people it can have, and whether it can sustain them. That depends a lot on the air, the water availability, and the green cover. Ultimately, we're talking about for whom we are building, their health, environment, safety, and overall sustainability.

How would you describe an ideal city?

An ideal city for me would be one that has zero GHG emissions. That is an ideal city and if I was an artist, if I have to paint it, then it would be a city which does not pollute any of the natural resources, whether it is water or soil. Where it has no pollution and is completely sustainable so it can manage its energy on its own without burning fossil fuels. Where wastewater gets treated right and rainwater is harvested fully so that we become fully self-sustainable in terms of water, energy, and even materials, along with food and clothing, and where everything can be harvested and created sustainably. This is the picture I would like to paint if you ask me.

Where do you think we are at this point with respect to your vision of an ideal city?

A lot of work has to be done but I am very optimistic about our current central government because if the right changes can happen, then we are on the right path. But it has to be implemented because we do have the right technology. There's no drought of technology and policies, along with people who can make the right ones. But I would still say that there is a lot of work to be done.

According to the World Bank, there's huge development growth which is going to happen in the next three decades till 2050, and most of it is going to happen in the emerging economies. But in the current scenario, we have a long way to go. Everybody should be working and be on their toes in order to get things implemented.

How do you think cities can be moulded better to perform in times of need or distress?

I think that's what the policy people have to do so that the cities have the right policies with them so that there are no research crunches. We need water and energy security which is not there right now. Another way is to have partnerships with the private sector. The PPP (Public-Private Partnerships) word has to come into place, otherwise, it's very tough because that's when the implementation can happen. The government also has to join hands with institutions so that they have the right technology on board, and they become aware of the right technology and can start implementing it.

How do you think cities can create sensitivity and safe spaces for historically marginalized communities?

I have a very straightforward answer for this. One very important thing is that we should understand their backgrounds. There has been a decline in the kind of handicrafts that we were developing earlier and what we develop now as a country. It's important that the government or the right organizations support the art or craft in which they were involved so that we don't lose it in the future. I think our cities can use that platform and help those craftsmen to take forward their roots or what their ancestors were involved in and give them that space.

I somehow do not go with the idea of only cities as mentioned in the question. It could also be in rural India. Wherever they are, the government should support and make sure that their craftsmanship is retained and enhanced. They need to be supported so that they can continue their traditional work along with the right kind of housing. They should be given those basic services with enough financial support so that they don't have to travel to newer cities or leave behind their roots or what their ancestors were doing, what was happening traditionally, and just change their occupation. It's very important that culturally as a country, the government should support them financially, and technically enhance their living quality overall so that they have all the basic things with them. They need to be given that support, along with a platform where it can reach out to other global markets.

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Moving towards transparent and decentralised governance for building sustainable cities in the future.

An Interview with Ms. Sobia Rafiq and Mr. Ankit Bhargava from Sensing Local
Date of Interview : 15-09-2022

Sobia Rafiq is an Urban Development Professional and a TRUE Advisor with over 10+ years of experience working across various sectors such as Solid Waste Management, Sustainable Mobility, Governance, and Public Space Design. Her commitment to solving complex environmental issues in Indian Cities has led her to work with a variety of actors ranging from city municipalities and state-level government bodies to private organizations and local communities. She is an active advocate for building inclusive and sustainable cities and co-founded Sensing Local (in 2016), where she continues to drive mainstreaming of participatory, data-led, and ground-up city-making.

Ankit Bhargava is an architect and urban planner with over ten years of experience in spatial planning, urban governance, system design, and architecture projects. His core interest is understanding how to disrupt the trajectory of development of Indian cities that invariably perpetuates environmental exploitation and deepens socio-economic inequalities. He is also deeply interested in using systems thinking and participatory processes to unpack complex systems and shape new perspectives that drive systemic change. He is also the co-founder of Sensing Local, which has been set up in 2016.

Firstly, being based in Bangalore, with the lockdowns being lifted, how has your field coped with the pandemic and its post pandemic after effects?

SR: As you're aware, we come from a background of urban planning and a majority of our work deals with the environment. So actually, the COVID situation was quite a boost for, I think, planning altogether. Not only for us as an individual firm, but I think for the sector as a whole with multiple things like The Cycle for Change challenge, Streets for People etc., came about around that time. People moved about and saw the city in a different light, which was devoid of vehicles, devoid of pollution, more of coming and occupying public spaces and using streets as public spaces. So, from a perspective of how the pandemic has been for us as a company, I think it's been a good thing for the sector. Of course, not to say that there have been other issues of managing the pandemic and work and everything, but I think as a whole for the sector, it has been quite a positive spin.

AB: Actually, this whole thing of seeing the Alter City was a huge phenomenon. I mean, the fact that you could see Mount Everest from parts of Bihar was just amazing. It was never possible for people to think of situations where air cleaned up in 15 days over parts of Delhi and Haryana and the fact that change is possible in an extremely short period of time. A lot of such anthropogenic reactions were visible through the crisis. We also witnessed the arrogance within institutions come down to realise that it was not possible to solve without bringing people together, and without taking each other's help. So, I think these two things were definitely a good thing apart from, obviously, the crisis of it all.

Looking through your website, what catches one's eye is the thought of oneself as an urban living lab. So, in that purview, how important is experimentation and collaboration with various stakeholders to your studio?

SR: I think it's good to have a bit of a context of what a living lab is and where it originated from. The living lab itself was a methodology that was developed at MIT. And the whole idea was to co-create solutions in a real-life setting. That is basically what a living lab does. The usage of a living lab for city development has been fairly new. That's been something that has been caught on in several cities across the world. In India it is just sort of starting off as a thing. We ourselves, as a practice, have been following principles of the living lab, I think unconsciously, almost to an extent. As urban planners, our largest role is consensus building and negotiation, which has been a big part of every project that we've done to

ensure that all stakeholders are included. And it is specifically important, I think, in the Indian context, where you have so much diversity in the way people behave, the way people use spaces, the way cultures exist. So, all of this sort of adds to the need that if you are creating a solution, then that solution cannot be one sided, it cannot be designed for one type of person or one type of user or one type of situation. A lot of our public spaces are multi-use spaces. A lot of them are used by various types of people, So, I think these factors work very well in a living lab situation. So at Sensing Local, we have sort of co-opted the term urban living lab because it has been a very integral part of our own approach and methodology and how we approach planning in the Indian city.

AB: I agree, and I think that's definitely the history of it. Experimentation is extremely critical right now, both for practice as well as for the field, because we are only now focusing on cities. I mean, everyone forgets that before smart cities became a thing, JNNURM, and other projects existed, but the focus: the real financial focus, is not on cities at all. We were still a country in the village, and so, there's a lot of work required to figure out on What are we? How do we want to plan our cities? Who are the people that make up our cities? What do democratic cities look like? All of that is still being figured out. So, anybody who says that we know and can run with it at present is going to make mistakes. A lot of our work has been actually to try to develop processes and methodologies where experimentation can happen in a way that is inclusive and it leads to constructive outcomes.

I see that most of your work is based in Bangalore. What made you choose Bangalore as a city of observation and experimentation?

AB: Bangalore is a happenstance in many ways for Sobia is born and brought up here, and I have also studied here, so, I have linkages here. So, it's a little bit of a coincidence. But the coincidence only lasts so long. The reason why Bangalore is interesting, compared to other cities, is that it is a city very much in the state of becoming in terms of its identity. We have a legacy of civic movement for 20 plus years and this is radically new, and this gives the foundation to explore a lot of new age governance and decentralization devolution. Also, the city is extremely fractured, like you see it's a plural polycentric city and, in those fractures, what we often talk about is that everything seems to be agreeable - people say yes to everything because it's such a fractured sort of identity with so many different things happening that within the cracks there is opportunity. And so, the government has become very open because of civic activism and active citizens over the last 20 years. The people are ready to do experimentation. One may witness on the other side extremely failed governance and planning systems and an active response because the city has been failing as well. It's one of the fastest growing cities collapsing on itself. So, it's both opportunity and problem at the same time within which these practices are able to blossom in a way.

You referred to the idea of governance and the governing bodies and from your work you do work extensively in collaboration with local governing bodies and so from your experiences do you think the authorities currently are proactive regarding sustainable development or are they lacking?

SR: Let me put this into perspective, on a positive side the government in Bangalore is fairly open and the municipality is fairly accessible compared to most other cities across India. There is a lot that people are able to do in terms of going and working with the government. Yes, we've got a climate action plan that is getting made right now, we have in the past put out solid waste management plans, we've done some level of innovative pilots whether it was the Church Street model etc. So, there's been a lot that has happened: there was a time when BBMP (Bruhat Bengaluru Mahanagara Palike) had looked at installing sensors for air pollution. However, with all of that done I think the biggest issue that we have in the Bangalore government is the fact that it is a flawed government system, because you have a lot of parastatal bodies that actually exist. There's very little coordination between bodies and that's like a whole other problem on its own. But on the other hand, what we see most often is that even though these plans are being made, a lot of times, there is very little capacity in the government to be able to actually see these plans through in an active manner. So yes, the actors outside are allowed and there have been openings into the government to work with them, but the government on its own is not proactive enough to be able to actually chase aspirational targets and visions. So, what is happening is most of the time these plans either become oversimplified, just because of the lack of capacity within the government to actually chase something more aspirational, or they sort of sit on the table and never get implemented. So that I think is one of the biggest issues that we fear as professionals and also as people living and working in Bangalore.

AB: I agree. The rate at which the city has grown, the institutions are not even willing to acknowledge that there are parts in cities that are urbanised, the peripheries are urbanising, and parts of the city lack infrastructure. I see so many of the government officials unwilling to acknowledge that we need to work at a certain speed and urgency and figure out in-between processes. So, it is a little bit of a lack of interest and capacity to tackle the reality for what it is, and completely not taking accountability for the fallouts that are happening because of not working in a certain system. Saying so, it is a lot of business as usual because nobody is held to the neck and as we have said all the parastatal bodies are their own bosses. Ultimately, until you know who is going to hold everything together, you won't have a system. The commissioner can only do so much. Part of the deal is also the whole broken system and part of the deal is that they don't have methods and capacities to deal with this crisis and don't know how to create processes that involve private agencies and civil society to come together to solve these things in unison.

Where do you think we as a community, as a group of citizens, are, in regards to respecting the ideas of sustainability and sustainable communities?

SR: Sustainability is so vast and wide, I think there are various people that are moving to or are becoming conscious about a sustainable lifestyle but the numbers are still fairly small. It has not yet been mainstreamed. I think there's a huge amount of gap in the infrastructure or even policy push, that has not mainstreamed sustainability. And as a community there's only that much that can happen with people being conscious about doing something. So, a very simple example is if we had a very good public transport system in place, and there were enough incentives to actually get people off their vehicles into the bus to actually use it. This will require a huge push financially to set up a good integrated public transport system and also from a perspective of making people change their behaviour which is a long term change which doesn't happen overnight. I don't think that if you're talking about sustainability as a mainstream thing it does not exist yet: it is still very niche, it is still very much also from a perspective where sometimes its based largely on whether it's convenient for a person to do it. So, there are two extremes: one, if I can afford to be sustainable, and the other extreme is the people who will push despite the discomfort i.e., because of holding on to the philosophy of being sustainable or leading a sustainable lifestyle. So their in between is the mass that is not able to do it because it's just simply not convenient enough to adopt a sustainable living. And I think that cannot be changed through just expecting people to change their behaviours on their own. There's a lot that is required whether it is awareness, whether it is the private market changing, whether it is the government policies coming in place, there are so many other important factors such as the very strong aspirations set forth and these aspirations are actually efforts that will drive sustainability to become mainstream.

AB: A lot of this from an individual standpoint is a very delicate balance between convenience, comfort, safety, and affordability. And I think too much stress is given on individual change which is by the way a global scam in a way that larger institutions, larger companies, larger processes take no accountability for anything, and everything is burdened onto the individual. The individual can only do so much and their footprint of decision making is small. So, there is general awareness, but yes it could always be more. Where are the larger systems going into this, like public transport? The focus has suddenly shifted on EV buses but there is absolutely no interest to do last mile connectivity. So how can you exist in both worlds at the same time? Ultimately the guy with the largest sort of power to change has to still be involved as the key actor to drive that change. Unfortunately, a lot of institutions are still dependent on saying there isn't enough demand. For example: we remember in June 2020, we released a report on air pollution, which was talking about and looking at all kinds of chemicals and other pollutants in the air, and we were talking to someone in the political space about it and they said, "Oh there's no room for cycling, cycling has been a failure in Jayanagar" and so on. Actually, it is all bad planning in general that led to the failure of the cycle in Jayanagar and six months down the line we had the Cycles for Change challenge, where everyone is suddenly okay with cycling and everyone wants cycling to happen. So, there are extremely false narratives about not enough demand, people are not doing enough. As soon as you put in, as Sobia said, the right incentives in place, plan your way for a pathway for sustainability, where the citizens are not criminalized, it's fine and things will move. The biggest problem is we see citizens as criminals, so they are the people who are always offending everything. So, I think there's a problem with the way democracy in our context is set up, that people who are voting people in power, are the people doing everything wrong unfortunately.

In your work with waste management, I have noticed there has been a lot of emphasis on decentralization and a decentralized model, but from your experience do you think that decentralization may in some cases lead to denying of responsibility by the authorities?

SR: Why would you say that? Decentralization does not mean that it's only at the individual household. Decentralization could mean having the government put up infrastructure at a ward level or at a division level. So, decentralization is not about only a person handling their own waste and not giving any waste to the government, so it's not really a removal of responsibility. The decentralization plan that we have worked with BBMP was to set up dry waste collection centres in every ward and to put up transfer stations, which is a whole different thing. By putting up composting facilities at a ward scale (leaf composting facility), we've not really worked towards individual household level composting because that's completely at the jurisdiction of an individual: if they are able to do it, if it is convenient for them to do it, if they have the space to do it, and if they have the time to do it. So, a city system never gets planned, nor is Bangalore system planned on what an individual's possibility will be to manage their own waste. It is always on a scale of self-organization that we believe can be managed. So, if you look at the waste management system that is here in Bangalore, we have a lot of infrastructure that is there at the ward level, of course, wherever there is land available, and then you move towards constituency level, which is around 7 to 8 wards which is your division level, and then we have them even at zonal level. Finally, if there's only one sort of thing where we have three landfills which are basically at the city level right. So, processing being close to the ward which is within your two to five kilometres or close to the division actually reduces everything. It reduces emissions, it reduces how much time is spent, it optimizes the collection and transportation system, it creates way more jobs, it allows for more value from processing waste, it builds in sensitisation of the public. As a city we were used to throwing our waste outside the boundaries of the city, not really becoming accountable for the waste that we generate within our boundaries. Decentralization, the definition or the perception that people have is not the right one. We have to understand that if we have to process our waste, we need land and land is a rarity in the city. We don't have as much land as we would require for the amount of waste that we actually generate. So, unless we all take responsibility at scales of organization where we know there is land available and manage it at that level, it's going to be very difficult for the city to actually even manage its waste or even find more space to throw it or landfill it,

as unfortunately if we don't segregate, that is where it has to go. And it's not like from there it's disappearing right? it has to be managed there and you're just creating more and more junk land which can't really be utilized much after. So, I think decentralized processing is the only way to go, there is no other way that we have, we cannot be an ignorant society where we continue to throw our waste and send it outside the boundaries it's not an option anymore for us as a city, for a lot of cities that have grown really fast across the world. It's not only Bangalore this is sort of been the way that every city now even in India is being pushed to move towards. Bangalore was one of the forerunners in that aspect of doing it way before Swachh Bharat Abhiyan started, and way before even the municipal rules had mandated this. So yes, it's not an either or.

How in your view can accountability be ensured in the various steps of resegregation? and because accountability is an aspect that even the UN (United Nations) lays special emphasis on.

SR: There are multiple ways of making people accountable. One can go through an incentivization path or one could go through a path where you disincentivize someone. So that would be fine through having large fines slapped on larger companies that are producing products such as plastic. But there are some very critical issues with our waste management system: one of the biggest issues is that as a city we have been paying, through our property tax, we pay for solid waste management and the amount we pay as a part of our property tax is Rs. 30 per household per month. That's nothing and yet we expect, and still rather, we expect that the municipality should manage the ways it should process and that it should give enough manpower to handle the whole waste system. I think it starts from a place right there where the city has been trying to push to increase the SWM (Solid Waste Management) cess and turn it into a user fee, which has been opposed widely by the politicians, largely by our corporators and by certain citizens. But when one sort of puts things in perspective, he/she should question: Where does accountability start? Where do I feel accountable for my own waste? How can I feel accountable for the fact that somebody else is manually handling my waste? How am I accountable as a person to ensure that I clean my waste before I actually send it out? if it is dry waste or packaged boxes, can I just rinse it or can I wash it? because somebody out there is handling it manually. And I think people have an opportunity to go and see dry waste collection centres which are all within one kilometre, two and half, three kilometres of everyone's houses now. Walk in there to see what it is. I think that by becoming personally aware is your first step to being accountable. I think taking that effort to understand how my city's waste is managed, what happens after I put out my waste? Am I putting it out in the right way so that somebody after it goes out of my house is actually able to handle it in the right manner? Or am I doing something wrong? And I think that that is the first step of being accountable, which is completely in our control as individuals. As companies of course you have larger policies, as a municipality you have better monitoring systems- all of these are required to come in place. But if you say, what is it that you and I can do, I think it is a very simple thing. We (Ankit and I) as architects, have done a project related to redesigning dry waste collection centres. We audited Bangalore dry waste collection centres and are building a massive team of interdisciplinary people to come and really rethink what the system actually looks like. Both from a design perspective of the building itself, and moving to simple policy level interventions that can come into streamlining it. But one of the most important things was the infrastructure for waste management. How is the dry waste collection centre designed? What kind of ergonomics needs to be followed? How do you look at systems in terms of flow of waste and space design based on that. I feel so little of this is actually known by architects, there aren't many architects that specialize in designing waste management infrastructure. We don't even look at it, right, so even as professionals, where is our accountability to see how we design this infrastructure which can be used by people in a manner that can make things more efficient. So, I mean accountability when one looks at any system, can come from an individual perspective, then it comes as a professional, or as people who go in as part of living in your house. Then one goes to their office or institution- is your institution following sustainable waste management practices, do you still give plastic bottles to the jurors in college? Are we conscious about that? When one goes to a public place, if they don't find a garbage bin the first instinct is to get it out and throw it! instead,can we just keep it with us in our bag? I think there's a huge sort of notion when we talk about accountability. The perspective that we try to push is, the accountability is you in the organization as well and if there are even two to three people in an organization/ a neighbourhood/ a ward/ a building, they can do massive things to change their waste management system in their own locality. Start with where exactly you stay or where you work or where you study and that's all is required, and that will obviously scale up if everybody did this in their own places of stay, work and study.

Going from land pollution to air pollution which literally affects us with every breath in terms of air quality do you think there is a reluctance in the way of setting stringent environmental standards for pollutants?

AB: We can keep going round and round on standards, technically any amount of pollutant in the air is bad for you, so no matter what WHO says, it's quite irrelevant, and I don't think anybody has been able to actually say that if your PM (Particulate Matter) is 150 versus your PM is 200 you know this is a little bit better, how much better is it actually?. A lot of the standard game is to show that most of the air is not as bad as people think. Yes, any pollutant is bad and that's how my colleagues in the evolution space put it. Obviously, a lot of this is political to say. Where do we set our standards so that we can say that these many cities/areas are having good days or bad days. I feel it is not reluctance, a lot of this is political projection, about how one appears in the global dynamics.

Moving forward, what in your view are some strategies and innovations that can help us improve our air quality in the contest context of our country?

AB: That's too big, and too many things I think I can talk about in the context of the city - because there's so many different pollutants that contribute to various things across

the city ie., there was a recent emissions inventory that was done by CSTEP(the Centre for Study of Science, Technology and Policy). Emissions inventory basically looks at calculating which are the areas that are producing certain kinds of emissions, what are the types of those areas, what are the types of those emissions and I think there was also a source of pollution study that was done. So, in Bangalore 60 to 70% of the PM 2.5 load is coming from your road and vehicles. So, it's the tailpipe emissions that get resuspended, you know goes up in the air again. So, in Bangalore that is the biggest criminal, however, a lot of the way this is distributed i.e., certain areas are much worse off than other areas. One sees a lot of congested areas in the city where pollution is extremely high especially city areas or industrial areas. There are also a lot of studies that talk about SO2(Sulphur dioxide) levels in the city being quite high because of the way industries are, and then there are brick kilns from outside the city. So, there is a little bit of this industrial pollution that is definitely there, even though we are not as bad as some of the other cities are, however, vehicular pollution is the dominant concern here. Pollution from waste has come down drastically. I think in the last couple of years it used to be much worse, but after vehicles it's actually construction waste and waste in general that is also quite significant.

How do you think we should tackle the conflict between biodiversity in terms of animals in the national parks and urban growth because there is a conflict between them.

AB: Okay I mean there's no real answer here. There are protection zones that obviously need to be created along these at least the well-known biodiverse areas. Biodiversity studies that have been conducted in Netherlands and other Dutch cities where biodiversity is not just defined by national Parks and Wildlife biodiversity, it includes all of your flora fauna and the diversity within your flora everywhere. So, I just want to make a distinction between what you are talking about as national parks and the conflict between animal and human conflict that's happening because of peripheral growth that's happening and therefore it's hitting that, versus the biodiversity as a larger concept which itself is different. Urban growth need not be in conflict with that at all like the lakes and the wetlands. All the wetlands that are being built in lakes are huge epicenters of biodiversity and in fact a lot of thinking and a lot of work has been done on these things. The conflict is different- the conflict is that one is designing these parks often to be mono landscapes incorporating just grass and plants. And so, it's not an urban growth conflict, it's more of an absolute lack of thinking about biodiversity in those various contexts. So, what is perhaps useful is to define is, what is the way biodiversity exists, what are its benefits and what is its value across the entire system, and then perhaps one can break it down more in terms of how conflicts of growth affect that. That might be a slightly more nuanced narrative to take. A lot of these things we've done around NICE Road has been to identify elephant corridors and other kinds of corridors and then be able to put in certain kinds of infrastructure that help control those conflicts. But as I said there is a larger concept that requires investigation into all of these other areas as well - like biodiversity along the street itself is a phenomenon that is not discussed. For example, to grow the same trees along the whole road has no reason for it. The way horticulture often goes about executing the parks and the development in lakes or the street itself is a huge question that's to be raised. So, it's not just always a growth conflict, it's more of who's involved who's listening and how are these works being done.

How would you describe the idea of your ideal city?

SR: I think I don't know if there is an ideal city. It seems so far away to reach the ideal city- there are good cities, and there are bad cities. I think a good city is where the city really works to provide equal opportunity, accessibility and infrastructure - all of which are basics. So, I think a good city does that to a huge extent, a good city will have a very actively engaging system for citizens to interact, a good city will listen to its citizens and implement things for the citizens, a good city will have lesser corruption, a good city will sort of have a good disaster response system. Every city has its challenges without a doubt, but a good city really aspires to provide that environment where everybody can thrive, whether it is a disabled person, whether it is a blind person, whether it is a child, whether it is a woman, whether it is an elderly person or, whether it is somebody on a wheelchair. I think looking at how everything can tell you right, like if affordability is an aspect for a city can I move from point A to point B within a reasonable amount of money, can I get healthcare that is accessible to me, do I have a place to play, do I have a park that's accessible to me, do I have education accessible to me, and all of this forms its place in how the city is planned. Whether I get clean drinking water, whether I have access to housing and schemes to be able to really improve my own quality of life. So, there's a lot of this that a good city will offer. Sometimes one thing is better than the other or sometimes you have cities that balance it all out and are able to maintain that integrated situation where you have all of these things that are taken care of and there's systems that work well there's with a good governance response system. So, I think my ideal city would be the one that actually works towards better quality of life across multiple parameters for various users of the city, not just a particular type of user or a particular group of users.

How do you think technology plays a role in building sustainable cities?

AB: Technology is actually a huge enabler right now for a lot of people that have been working. So, a lot of analogue systems that have been extremely limited in terms of the reach to people in its memory, of how things are handled, paperwork is still remaining on files that nobody knows how to access, they are all black box methods. So, a lot of these analogue methods are highly restrictive in terms of who has the power, where is the chain of command, who can see, how the process is being undertaken and what stage it is at. A lot of where technology is going right now is actually empowering more and more, and bringing transparency and engagement through it all and this is exactly what the Internet did as well through a lot of processes. So just opening up these black boxes and saying I should know if I have made a complaint, where it is on the chain, where are you going to solve it, when is it coming back to me, what did you do and so on. If one looks at it from our perspective, technology is being used really to do data collection which includes the person and the end user within that process which has never happened

before. Otherwise in city making processes in India, because it just wasn't possible, one always saw it as the manpower of the government that could go and do these surveys, but they included highly biased surveys, where one does not know who is being included or excluded and there exists institutional marginalization. Today, a lot of what technology is able to do is make people who are already making the city, able to make claims to the city, and represent themselves because of these various platforms that are getting created and avenues that get created- giving power to many people. Also, a lot of what we're able to do through GIS mapping, a lot of modelling that's happening is really enabling things that were everyday processes that could take a very long time to get automated. So, we are able to do a lot more than what would have happened previously. Speed, transparency, inclusion, democratization all of these words are at least some of the things that I would associate with it. This at the same time technology is building the surveillance economy is its own parallel negative side that has to be watched out for and of course people building those systems and whether they make them inclusive or not. Because of all the work that Sobia and other people have done in the waste management work with the government, we were solely responsible for ensuring that the public data on solid waste management got out and was accessible to the citizens; this was only possible because there were these platforms. The team actually worked with the IT team in BBMP to get it built. So, you know which otherwise would not have happened.

How do you think that the future city should build resilience against man-made and natural calamities?

AB: A lot of this building resilience for the future is listening, and doing planning that is inclusive. And there is a nice podcast that we've been listening to recently which basically said that political cycles are all five years, so why will one ever have long term thinking coming from political cycles. If my vote is always constantly dependent on showing something for a five-year time frame, I'll never think of a 15-year 20-year time frame. So how will I look after the child's interest, who's not even able to speak right now and he might only become vocal in 15 years but how will I look after his future or how will I speak for people who are not even born yet but are going to face an extremely harsh reality because of what we are causing now. So, a lot of this is really looking at inclusion in an extremely widespread manner, looking at age, gender, religion, all of these class differences, and looking at representation in a way that it takes care of all of these things and that we are able to think long-term. So how will you build on this representation is basically the way we build the future if we do not include people in the process, it will all fail one way or another.

SR: I think just to add to that: We had worked on, especially during COVID time with the ward committees. One of the parts of the ward committee was disaster management - which sort of got the ward data committees set up during COVID. If you see Kerala's response to COVID and disasters in general it is very good- the reason being, a decentralized governance system that exists, and a strong response system. We are not in denial that we are going to have more and more climate impacts. We recently had several areas that were affected by floods in Bangalore. It is largely man made and we had a climate situation which was really unprecedented rain that came about. But we didn't have a good enough response system it only will tell us how things go, because if from here if say we were ready with the response system if people knew, where to complain, who to complain, to if they knew how to warn other people, if there were ways to get people out of their homes. There is an issue with flooding in certain areas, if we had a digital database that held the memory of the floods which Ankit keeps also talking about, saying that right now if we had a flooding situation do we have the data regarding where flooding happened? Did we as a city collect that data? No! Will we learn from that experience? I don't think so, there's nothing here that we have set in place or that we know about apart from the fact that the government is blaming the previous government for the flooding that has happened. So as a response to natural or manmade disasters, it is not just about the situation of when the disaster happens but it's how one manages the disaster after it has hit. We will not be able to control natural calamities that will take place, however, the only thing we can do at the moment apart from working towards mitigating it, is adapt. Adaptation means that we should have systems that are going to be good disaster response systems, that are well thought through and that we continue to collect data when things happen, so that we are able to plan better for it and we are able to put in measures to be able to adapt to these situations of climate change. This is the biggest issue and connected very easily to what Ankit is saying is why would the government care about it because they are just working towards their five-year timeline. So, I think there's a massive issue. Of course, there are certain systems that are flawed but there's a massive issue that the government, even despite everything that happened, is not moving towards a system of evidence building and response systems that can help with the next disaster that hits. If we are not able to manage this one, how can we manage the next one better? We don't see that questioning here unfortunately, however, that should be the way that we actually go.

How do you think architecture can be used to create or develop cities which are culturally, socially and environmentally sustainable?

SR: I think as architects we are in a very unique position in the sense that we are going to be the people that will be influencing the way the city is made. As architects we diversify into various other fields, whether it is the real estate field, the building field, the planning field, the urban design field, the interior field, the construction field, whichever it may be, as architects it is very important that we understand and become more and more aware about our own contribution to the environment. It is unfortunate that one is not taught about it entirely in college, and we don't realize our own value- to the way the city is made and our own responsibility towards how the city is made, and I think that becomes very important as we move towards a better future. If we as architects don't bring out our own aspirations of how we see the imaginations of the city, there are lots of other people that are making the city based on their own whim and fancy. So, architects have to become in a sense active enough to be able to reclaim their place in designing the city. They also

have to make themselves self-aware of what better can they do in the different fields that they get into towards making a sustainable city. It starts off with a very simple thing of saying that if one is managing construction in a site of whether it's a house or its interior, where is that construction waste going? Is it being utilized in the best manner? Are they using the best materials? It starts from there right up to when somebody is designing a public space- to question if they are including people in designing the space or are they just assuming that it is their design that has to float. So, there are a lot of these things that, we as architects, have to be aware of and I think both even with the way we get educated and we educate ourselves, it's very important to not become ignorant as a professional and as a community of the surrounding that you are in. Architects are very powerful in what they can do. But it's just sort of up to us, as a fraternity, to really make ourselves relevant in this, in the next few years of development, and ensure that we push the notion of sustainable development way better than the previous generations are.

AB: I agree. The only thing I would like to add is that often people talk about the number of buildings and construction that's going to happen in cities in the next 10 years is going to be more than the amount of construction that's already happened. That has to be a call that architects have to understand, and not engage with the 0.1% of the population and these bourgeois activities that most people just end up doing and really understand what is the role in actually engaging with the mainstream. The housing that's coming up if you look at all over the city it's ridiculous not just from a sustainability point of view, but it is unlivable. How do people train themselves to actually engage at scale, in a way that we are not building cities that are ugly and unlivable, is the real challenge actually and needs to be taken on.

Finally after listening to all of your thoughts and all of your work, I'm sure students and academicians from across the colleges would like to help out and add to your studio's work, so I would just like to, as a final question ask if there a volunteering system at Sensing local that the students can use?

AB: Yes, there is. We constantly have people who come and volunteer with us in fact and, I must say also before we hire people, we actually have a one-month volunteering period. We often reinstate because one has to understand what they are getting into. So yes, there is a volunteering system, we have an active program where people from multiple fields come in actually for a variety of periods of time to do that for us- ideally a two to three months' commitment is minimum, because by the time you get in and try to understand what's going on, time is up if it's anything less.

SR: We are also introducing a program called Citizen First- it's a program that we are launching soon. These are actually small workshops that we will be conducting over the next three to four months. This is something we're trying out because we've done some of these sessions before as well. The whole idea about these workshops is threefold- one, the first level of the workshop is our exploration sessions, where we basically expose students professionals' citizens to various governance systems; two, we have a training series that we offer which is largely teaching people digital tools which they can use. These are open-source digital tools which people can use to be able to collect and visualize data. And we have a third type which is co-create where we will be organizing almost four weekend long sessions where a lot of students, young professionals can actually come together with communities in the city to be able to ideate and think about issues in the city. So, we are realizing that there is actually a knowledge gap, for even students and young professionals as well as citizens who want to start working in the civic space. The Citizen First program is largely to help people start that journey of beginning to engage in the civic space and the environment space which otherwise you don't know where to start- it might seem too overwhelming and daunting. I would definitely urge more students as well to start becoming self-aware of their own surroundings and how they can contribute.

A Kalpa initiative

In line with the theme of Kalpa this year - SDGs, a competition to make installations using discarded materials was conducted in the college. These installations were used as props for pictures during Diwali.

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