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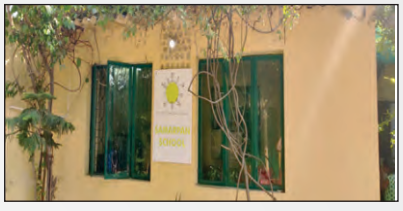

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EDITORIAL

Ar Anand Palaye

Dear fellow architects and readers,

The year 2020 began with the usual anticipation of pleasant happenings. As we moved just a little down the road, a very unpleasant chain of events has confronted the world with potentially fearsome projections.

A new virus Covid 19 is with us and holds a potent threat of interrupting normal life as we know it. And a lot of media fanfare is really adding fuel to the fear fire.

This challenge will certainly need different responses in various facets of life.

India's executive apparatus and medical fraternity is certainly proving its mettle in handling this unprecedented threat to human life.

One fact, rather sad, but a fact never the less is that our overcrowded cities in general and public spaces in particular need to be reworked. Government has shown its sensitivity to this by asking stake holders to redesign the public places and transportation so that it does not encourage a nasty spread of such illness.

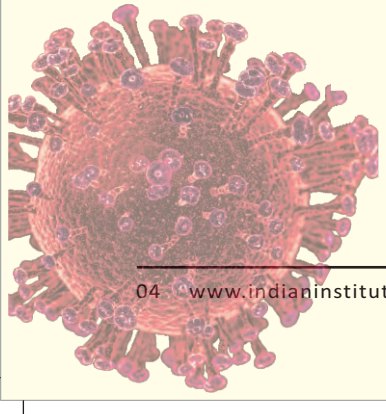
Architecture and design community will respond to this peculiar situation. We will be featuring papers and research articles relevant to this topic in this and forthcoming issues of JIIA that will display such design responses.

Resilience is an intrinsic quality of our nation and humane responses to natural calamities and other disasters bear testimony to this basic quality of our people in general.

While the COVID-19 pandemic has brought a wave of sadness, uncertainty, and disruption, we must remember that although we have little control of this situation, we all have full control of our ability to respond. We, architects and designers, shall do what we do best: face the future with optimism and creativity, and adapt to our present circumstance so that when the coronavirus pandemic passes, which it will, we will emerge ready to design a better future.

We request you all to contribute in forms of ideas for such solutions as we surge ahead in these pandemic times to make JIIA - the most reliable source of knowledge sharing.

Stay home, work from and be safe.

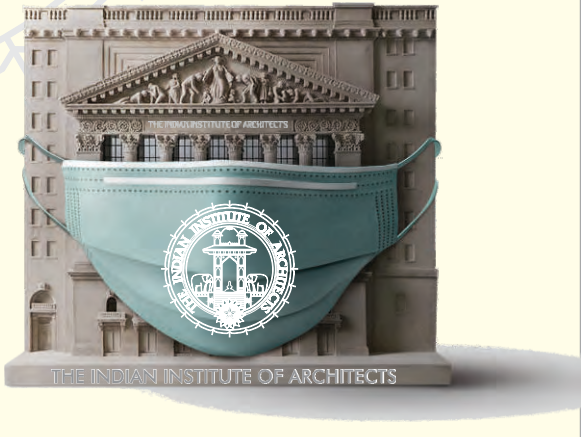


Ar Anand Palaye
Chairman - Publication Board & Executive Editor,
JIIA

Ar. Divya Kush

PRESIDENT'S MESSAGE

Dear Fellow Architects,



Ar Divya Kush
President
The Indian Institute of Architects

BUILDING RESILIENCE WITH IIA

The recent COVID-19 pandemic has affected the world in unforeseen ways, and the consequences are proving to be immense and far-reaching. Many experts believe that this situation has worsened the woes of our economic state, and deeply affected the construction industry in particular- reduced construction outflows attributable to a slowdown in project execution activity, a weaker real-estate market and probably low disposable incomes for the client due to global economic disruptions are some of the most direct impacts. This, in turn has affected the stakeholders- architects, skilled and unskilled labourers, builders, material suppliers, trade partners, contractors and many more. Students and colleges are also another large segment of the fraternity staring at uncertain times.

The Indian Institute of Architects in association with Ethos conducted an open session on Acedge on the 25th of April 2020 to discuss concerns within the fraternity and to strategize the course of action to help Build Resilience on all fronts. The discussion with Ar Divya Kush (IIA President) was moderated by Ar Vijay Narnapatti (Founder, mayaPRAXIS design + architecture) and was targeted at understanding strategies to build resilience within IIA and from within IIA. The session addressed issues and questions from the fraternity, academia and practicing professionals.

The need for Architects to engage at the grassroots and community level was highlighted, to be able to play an influential role in nation building. Ar Divya Kush highlighted that IIA will get in touch with rural administrations such as Panchayats and relevant government departments to ensure that designed built environments are not limited to urban areas. Other issues such as pay-scales, opportunities for fresher architects, quality of architecture education etc. were also taken up briefly. The recording of the session 'Building Resilience with IIA' can be accessed at:
www.acedge.in/courses/building-resilience-with-iia.

The IIA during this open session, also announced an open online Call for Ideas: To build Resilience and Antifragility. Through this call, The Indian Institute for Architects (IIA), in association with Ethos aims to support ideas that propose realistic solutions to practical challenges faced by the architecture and construction industry in the given COVID19 pandemic situation.

The Brief titled COVID-19 Call for Ideas to build Resilience and Antifragility' is co-curated by Ethos and Ar Darpana Athale. It states 'This idea- the solution could be a product or a process targeted towards any one or multiple group of stakeholders within the architecture, design and construction fraternity'. Entries are allowed to focus on Communication, Design, Process, Innovation, Technology or any other action area that the participant identified. Proposals that have the potential to create a significant impact to any of the stages of coping with a pandemic and its effects are sought.

The selected ideas through this initiative will be presented to appropriate authorities for discussion and execution. We invite ideas from across the globe, especially from the Architecture and Design fraternity. It is time for members of the fraternity to come together to pool ideas and find solutions to some of the problems that we are facing and are likely to face?

Important Dates:

Registrations Open	25 Apr - 20 May 2020
FAQs Release	5 May 2020
LIVE Ask-Me-Anything session	8 May 2020
Submission Deadline	25 May 2020

Registrations and Brief at:
http://ethosindia.in/events/the-covid-19-pandemic:-call for-ideas-to-build-resilience-and-antifragility/index.php

POST-PANDEMIC ARCHITECTURE

AN IDEAS COMPETITION IN WORDS AND ILLUSTRATIONS

KARNATAKA CHAPTER

Open to all IIA members with no restrictions on position of offices held. Members can participate in groups, with the team lead as an iia member. other participants of the group may / may not be architects.

LAST DATE FOR SUBMISSION:
26 APRIL 2020 (midnight)
All entries must be e-mailed to
iiakc.ppa@gmail.com

The 3 best entries from each category will be published in the IIA journal and website.
Students will receive participation certificates.
The submission must have the following details in a separate pdf:

- Name (In case of an individual submission)
- Name of team lead and team members (in case of group submission)
- Firm / College name, with name of team lead and team members. (In case the submission is from an architectural practice or architecture school)
- Membership Number of team lead
- IIA Chapter name with Centre / Sub-centre
- 5 digit number code of your choice

CATEGORY - A
Ideas in words

No. of word - Min 1000, Max. 2000. with optional images (that have no copyright restrictions)
No. of pages - Content restricted to 4 nos. A4 size pages composed in portrait format
Font style - Times New Roman
Font size - 3 MB max. All pages to be merged into a single PDF.
Code and File Name: Each page to have the 5 digit code anywhere on the sheet
File name to contain the code at the end, as follows: IIA_PPA_A_12345.pdf

CATEGORY - B
Ideas in illustration with description

No of pages - 1 or 2 nos. A3 size pages
Type of illustrations - Drawings / sketches / concept 3D views / collages, along with a write-up of 200 to 500 words
File size - Each A3 page to be 5 MB max. Merge both pages into a single PDF of max. 10 MB
Code and File Name: Each page to have the 5 digit code anywhere on the sheet
File name to contain the code at the end, as follows: IIA_PPA_A_12345.pdf

The decision of the jury is final
For any queries, please email to Yamini Kumar at
iiakc.ppa@gmail.com

Covid 19 : Interface with Architecture and Planning

- Dr Vasudha Gokhale

Dr. Vasudha A Gokhale is a Professor and Head of PhD Research Centre at Dr B N College of Architecture Pune. An illustrious alumnus of MANIT Bhopal, she completed her M Arch and PhD from IIT Roorkee. she has more than 20 years of academic experience. Member of Faculty of Science and Technology and Board of Studies at University of Pune, she has more than 125 research publications to her credit.

Abstract:

The world is muddled with a global crisis caused by the COVID-19 pandemic affecting built environment as a whole. History is evident that architects and planners redesigned cities initiated urban reforms and explored new concepts for minimizing the risk of infectious disease. This research seeks to investigate occurrence of Covid-19 and its interface with architecture and planning aspects of built environment. It examines the past occurrences, evaluate current architectural and planning interventions on onset of pandemic. Anticipating a relatively unknown future it is aimed to offer insights for architects and planners in order to prepare them for post pandemic scenario.

1. Introduction

From historic times physical spaces were designed and inhabited primary as a defence against epidemics. The Greek physician Hippocrates who is recognized as the father of western medicine theorized that poor physical environments, contribute to the spread of diseases and other illness and advocated that areas with fresh air and water promote health. It had been argued that poor sanitary conditions, noxious air, filth were the major cause of the epidemic diseases that flourished in the rapidly growing industrial cities of Europe. This was often referred as “miasma theory” which means “pollution” or “bad air”. As per “Miasma theory” disease originated from the decomposition of organic matter creating a noxious which carry disease-causing agents.

It was postulated that people could contract disease by inhaling foul-smelling air associated with contaminated drinking water, unsanitary conditions, and air pollution. This phenomenon resulted in sanitary reforms that helped in reduction of the casualties because of epidemic diseases in cities and towns.

2. Pandemics and Urban Reforms

It is evident that epidemics has stimulated urban reforms and changed the character of architectural development by and large. In 14th century the bubonic plague which wiped out at least one third of Europe's population initiated the activities to clear squalid and cramped living quarters, create larger and less cluttered public spaces and develop quarantine facilities. Outbreak of smallpox in the 19th century brought broad boulevards to Paris which changed the cityscape.

The improved water systems, introduction of modern urban sanitation systems and enforcement of housing regulations which were initiated as a measure against respiratory diseases in overcrowded slums in London are some of the urban level initiatives. Urban reforms in the onset of tuberculosis, typhoid, polio and Spanish flu in 20th century included structured urban planning measures, single-use zoning representing separation of residential and industrial areas, slum clearance, tenement reform, and waste management. In early twentieth century, the adoption of contact theories of infection and aseptic practices suggested that the building's material design and construction could play a critical new role in disease prevention. *(Kisacky, 2013)*

The development of the germ theory in the late 19th century brought attention to indoor air quality, ventilation and hygiene. Powder rooms were created near the front door so that visitors need not to go into the house. New concept for bathroom design evolved rejecting stuffy Victorian bathrooms in favour of hygiene and sanitation. New material introduces that could be easily wiped-down, washed, or swept and do not harbour dirt, dust and germs.

The immediate aftermath of New York's second cholera outbreak Central Park, New York was proposed and constructed in due course of time covering about 3.41 km^2 of land in the middle of Manhattan designed by Olmsted. The first child of Frederick Law Olmsted had died of cholera. He recognized importance of green spaces within urban areas and later he designed more than 100 public parks and recreation grounds in a number of US cities such as Boston, Buffalo, Chicago and Detroit.

3. Role of Architects

Architects have played a major role in creation of healthy and safe buildings considering epidemics outbreak. A new building typology came into being in response to Tuberculosis in the form of "Sanatorium" a live-in hospital made up of cabins where patients could get plenty of fresh air, a healthy diet, and prescribed rest and exercise. Construction of many more sanatoriums followed throughout Europe and other countries observed with the involvement of a number of architects.

Paimio Sanatorium designed by Alvar Aalto in 1920 was conceived to promote recovery from the disease. The design and the materials used were selected to boost recovery from the illness and Aalto referred this building as "a medical instrument" **(Fig.1)**. In late 19th century Villa Müller at Prague was designed by Adolf Loos included a separate space to quarantine sick children. The industrialized austerity of Ludwig Mies van der Rohe's buildings comprised of empty white walls, bare floors, and clean metal fixtures demonstrate their cleanliness. Richard Joseph Neutra designed Lovell Health House at Los Angeles, California` demonstrate his love for transparency, and hygiene. **(Fig.2)**

It has been stated that Le Corbusier lifted Villa Savoye off the humid ground to avoid contamination. The placement of a wash hand basin at the entrance hall represents a new concept of architecture and design that emphasises hygiene. The surge of modernist sanatorium design observed in the 1920s and 1930s characterised by large windows, balconies, flat surfaces to avoid collection of dust , white coloured spacious interiors reflecting cleanliness and hygiene.

4. Interlink with Urban Design

The United Nations has described the COVID-19 as a social, human, and economic crisis (United Nations, 2020). It has been stated that multiple factors such as air pollution, environmental conditions, population density contribute to the severity and rate of spread pertaining to the pandemic.*(Mollalo, 2020)* Several other factors like age structure, population flows and control measures, psychological interventions, neighbourhood characteristics play decisive role in emergence of COVID-19 cases and casualties. *(Sannigrahi, 2020)*

Urban design characteristics such as the densities and relative locations of job, housing, and services within a city influences the transportation choices of the inhabitants which in turn shape interaction networks through which diseases are spread. *(Brizuela, 2019)* Controlling the spread of infectious disease, calls for minimization of the interactions between the citizens. It is most likely that the strategy aimed to check the speed of virus spread with reduction of social interactions face to face connections, and outdoor activities might adversely affect life of urban dwellers as well as the activity pattern and inherent meaning and sense of belonging. *(Lak, 2020)*

5. Tactical urbanism vs. Strategic urbanism

Urban planning, architecture and public health played important role to prevent pandemics from historic times and traumatic experiences have always had an impact on living environment. On onset of COVID 19 lock-downs and social distancing have stopped to access leisure facilities, social contact which adversely affected everyday life in urban settings.

As a result, public spaces became ghostly appearing dangerous and unwelcoming opposing their actual intention to attract people, build community by bringing people together and create local identity.

Considering stay at home and use virtual media cannot be a long-term solution for human interaction many interventions based on concept of tactical urbanism took place to respond to the emergent needs of urban

Fig.#1: Paimio Sanitorium, Finland

Fig.#2: Lovell Health House, Los Angeles, California, USA

Fig.#3: Tactical Urbanism interventions: Melbourne

Fig.#4: Strategic interventions at Milan

residents all over the globe. Tactical urbanism emerged as a formal movement in New Orleans in year 2010 representing low-cost, temporary changes to the built environment, intended to improve local neighbourhoods and gathering places in the city.

It was initiated with an aim to promote various interventions to improve urban design and promote positive change in neighbourhoods and communities which is adopted in current pandemic scenario. The interventions included provision of temporary bicycle lanes, planters, widely spaces seating in public spaces to achieve social distancing ***(Fig.3, fig.4)***

Bogota, South America added 76 km of temporary cycle lanes along the city's BRT routes, and Berlin, Germany adopted use of tapes and mobile markers to create quick 'pop-up' cycle lanes. London and Dublin widened sidewalks with temporary cones to ensure physical distancing in shopping districts. Auckland and Singapore marked seating and standing positions to ensure physical distance on public transport.

Milan, Italy became the first city to announce permanent changes, with the widening of sidewalks, 35 km of new bike lanes and the removal of lanes for vehicles which could be considered as a shift from tactical urbanism to strategic urbanism *(Chu,2017)*.

6. Shift from Socio-petal to Socio-fugal spaces

Ideal urban spaces are largely looked as socio-petal spaces which are basically designed with an aim to provide a sense of belonging create an environment in which people can feel competent with self-esteem and have an aesthetic that fits that context. It is a space with human scale, having convenient context for diverse activities and interactions **(fig.5)**. On the contrary socio-fugal spaces represent an environment that meant to keep people apart **(Fig.6)**. Somer (1967) referred socio-fugal spaces as large, impersonal spaces without opportunity for conversation, isolation and concentration without cohesion. The concept of socio-fugal space however represents a limited view of environment it is to be adopted in current pandemic scenario where individual isolation is a priority.

The stay home advisory dictated people to withdraw into their private spaces. People having spacious houses with enough living space with a garden, a terrace, or a balcony found it acceptable however a larger portion of Indian population forced to stay in rundown and cramped accommodations *(Hummel 2020)*. Density however is recognized as a factor promoting the virus's outbreak many considered that spread of

Fig.#5: Socio-petal Space

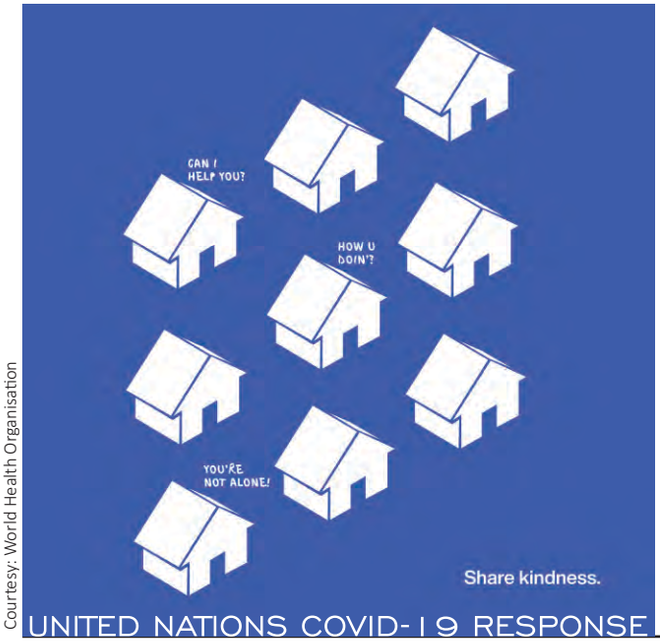
Fig.#6: Socio-fugal space

infection is not an issue of density but is a design issue noticing the less populated parts of New York having higher rate of infection as compared to densely populated areas.

Vanishing third place which represent the social surroundings separate from the two usual social environments of home ("first place") and the workplace ("second place") placed unprecedented burden on home space. Small apartments, especially with young children, need to entirely transform home interiors. Change in activity pattern observed as kitchen is no longer acted merely a place for cooking and a bedroom is no longer a place to take rest challenging multi-functionality and adaption potential of home environments. People discovered new corners and functions for small spaces, walls, ceilings, windows and balconies exhibiting creativity and fluidity of spaces.

7. Towards Prophylactic and biophilic design

Although it is too early to predict about the actual post pandemic scenario some future trends in architecture



Courtesy: World Health Organisation

architecture may need focussing on health-oriented approaches based on new standards and parameters. There will be a rise for biophilic design with an engagement with nature at different levels which could impact health and well-being of people and city as a whole. Design and selection of material is likely to change according to the current situation to respond to new forms of living and prevent the spread of diseases.

Designers are likely to conceive designs exploring new configurations with social distancing measures in mind oriented towards eliminating risks of transmission. Planning and design grid may shift to 1.5 m module both in interior and outdoor settings. Some other Prophylactic design include making aisles wider in retail settings, providing larger cubicles in open office planning and designing smaller classroom sizes in schools. “Touchless" environments may become imperative where more thought to building entrances and especially in elevators may become desirable.

Some of the perspective measures include the installation of automatic door high-use entrances/exits to limit the transmission of contaminants, use of motion sensor lights and hands-free fixtures. Creating Antimicrobial surfaces may be preferred which supports use of paint, flooring and hardware materials that is anti-microbial or can be easily cleaned like lead-free copper, quartz. Single Direction Flow within the indoor and outdoor spaces may reduce the face to face interaction to avoid spread of infection.

These are highly uncertain times and currently the focus is on consequences of this crisis. It is now essential for architects and planners to be well informed and prepared for future considering the practicalities and plan for a 'new normal' architectural development beyond Covid-19. ■

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PUZZLING THE PAST & PRESENT FOR SURVIVAL OF FUTURE IN THE SHADOW OF CORONA

Ar Mrunal Garud

An alumnus from Sinhgad College of Architecture, Pune (2015) followed by professional experience in Pune with Environs India, PlanArch, and Design Consultant Architects where she worked on housing, institution and commercial projects. After shifting to Nashik city, she has set up her independent practice, offering her expertise in architectural and interior projects. Some of her design interventions include, Commercial, Residential, Institutional and interior projects in Pune, Nashik and Thane region.

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This is like rearranging of puzzle pieces from past till date and creating a suitable picture for current scenario. It's not about the pieces, but how they work together is important. Finding the right parts and eliminating wrong parts to make a complete right picture out of it.The 21st Century has been cursed with SARS, MERS, Ebola, Bird flu, Swine Flu and now the contagious Covid-19.What does this pandemic teach us? Why we needed lockdowns and invite economic crisis to defeat the health crises? Where do we lag? What if we have to live with this and such more similar issues hence forth? We need to think what changes we need to make in our Residential, commercial, industrial buildings and spaces and also about the pattern of its usage, to cope up with the bare minimum required precautions to fight such pandemic situations. If we don't think and start acting now, then it would amount to ignoring the nature's alarm. Thinking about the solutions, why is it always necessary to find only new solutions? What if we go back and analyse the past and present simultaneously and rearrange the facts and solutions to create a new formula just like a puzzle?

image courtesy: www.waj.com

INSPIRING FROM THE PAST

The reason behind diversified world-wide architecture followed by culture is the geographical and natural conditions. Concentrating our attention to Indian ancient architecture, here are few of my observations and thoughts on how the same can assist in prevention, containment and treatment of infectious diseases if we design spaces purposefully to suffice the requirements. Somehow, we must admit that the planning, designing and quality of building of the traditional buildings is worth taking an inspiration from which not only catered the needs at that time but it suffices the requirements even as of today, and in pandemic situations as well. If we go through the typical wada planning, there is a particular pattern followed by most of the previous old houses (wadas) which ensured chronological hierarchy of activities without compromising privacy and hygiene.

For instance, in the following plan we can segregate the whole area in 3 parts: public, semi-private and private. Public area (highlighted in yellow) includes entrance door, fountain and first courtyard which was used for social gathering which lead to rooms accessed by

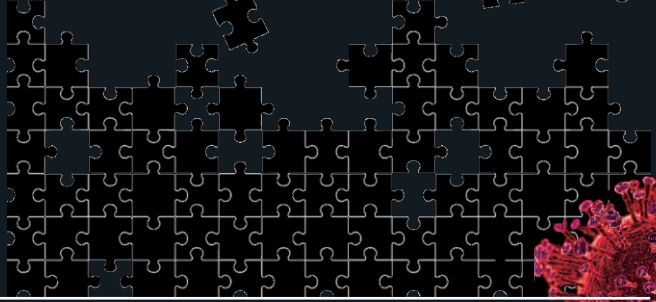


image courtesy: www.dhepewada.com

guests. Semi-private area (highlighted in red) includes antechamber, verandas, and offices. Private area (highlighted in blue) included the second courtyard, surrounded by area used by the family only which included the spaces for kitchen, store room, prayer room and the balantini kholi delivery room). The former planning was in such detail that in absence of easy availability of professional healthcare services, hygiene could have been well maintained within own space.

The chronology observed was: public -- semi private -- private. The residences we dwell in nowadays do follow the same sequence to some extent. So what exactly do we lack in our planning of residences, so as to tackle the current and upcoming pandemic-like situations in which self-hygiene and social distancing are of utmost importance? Could we look back at our architectural history and take some inspiration?

Well, there are few things which we must consider and redesign in current dwelling systems. Back then in times when people used to live in wada / old houses, they had a small washing place just outside the building which they referred as 'mori'; some wadas had this fountain intruded in first chowk which was a public area. There was a habit of self-cleansing before entering into further defined spaces.

Fig.#3: Pictorial example showing chowk of Vishrambag wada, Pune situated in heart of city.

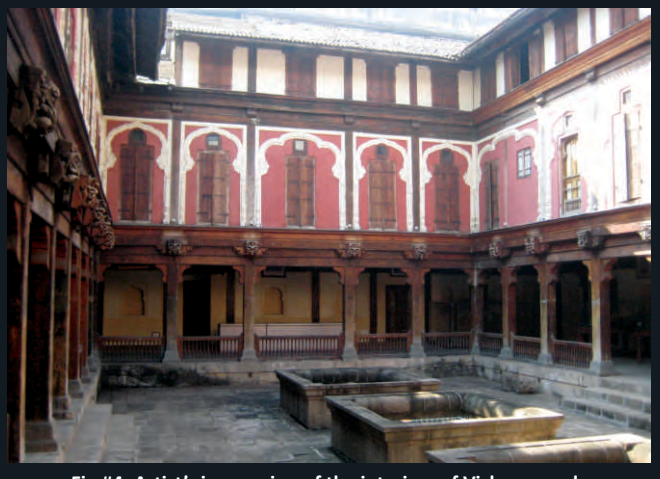


Fig.#4: Artist's impression of the interiors of Vishram wada

The time has now come that we rethink on those aspects of hygiene and apply the same in our day to day life. Powder room near entrance or designing wet / dry passage leading to living areas, small storage for guests to keep their belongings and / or guest room near living room, are some of the few changes I think we should implement in residential areas.

Sharing an example of a residential flat, how can we rearrange or re-plan our future activities. PLAN #1 shows the original plan of residential flat. The hierarchy/ circulation of spaces as seen is entrance leading to living (public area) and dining area (semi private area) which branches to respective bedrooms (private space). PLAN #2 shows the possible changes which can be made considering self-hygiene before entering the residence. Entrance is first leading to a small area having wash basin and small wash place so as to wash hands and feet etc before entering the main premises. Also rack for the visitors for keeping their belongings outside the main premises is provided. The vertical space utilization for storage could be used as a simultaneous-alternative in such cases.

Here's Example 2 for Residential flats:

Picture 1 as previous. Picture 2 shows the possible changes which can be made considering self-hygiene before entering the residence. Considering the minimum circulation of maids, the flat could be rearranged in such a way keeping the added wash area intact; the servants / cook / maids can enter through utility area directly into the kitchen without disturbing through living areas.

For commercial spaces more sanitisation is required so accordingly, if we consider the average routine of an employee of a company or field, it can be worked out by TEN things:

1. Placements of washrooms/restrooms/changing rooms near entrance so as the person can first sanitise himself/herself and change to the desired sanitised clothes which are could be common for rest of the people.
2. Sanitization units at regular intervals which may include hand sanitiser, tissues, dustbins etc.
3. Thermal checking, screening and sanitization at every entry/exit points.
4. Social distancing at workstation, reception, canteen or dining area by rearranging spaces.
5. Weekly or twice a week complete sanitization of whole office indoors and outdoors.

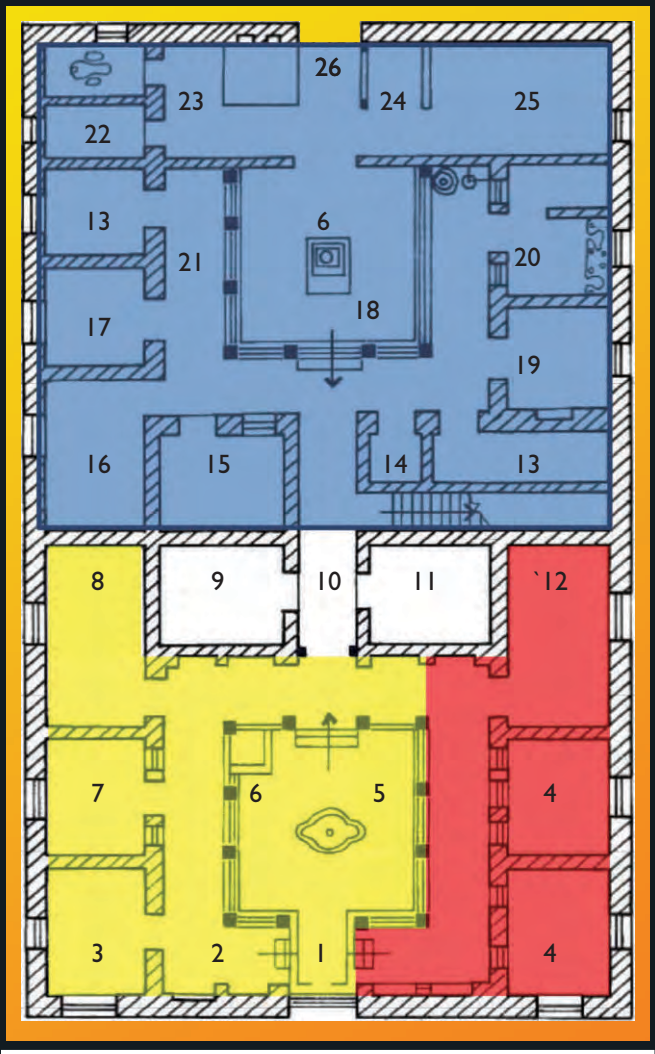
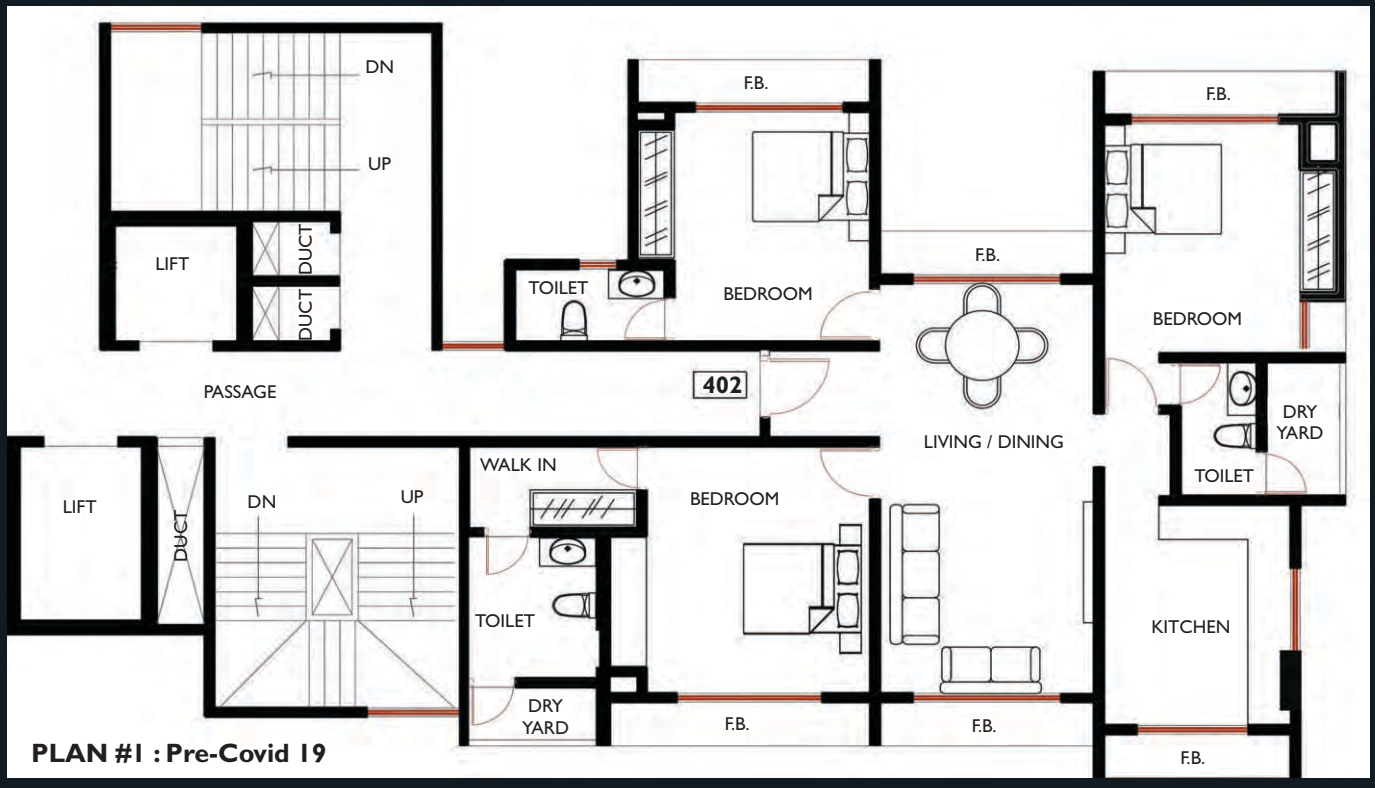


image courtesy: Kanhere G K. - Marathawadas, 1982

LEGEND

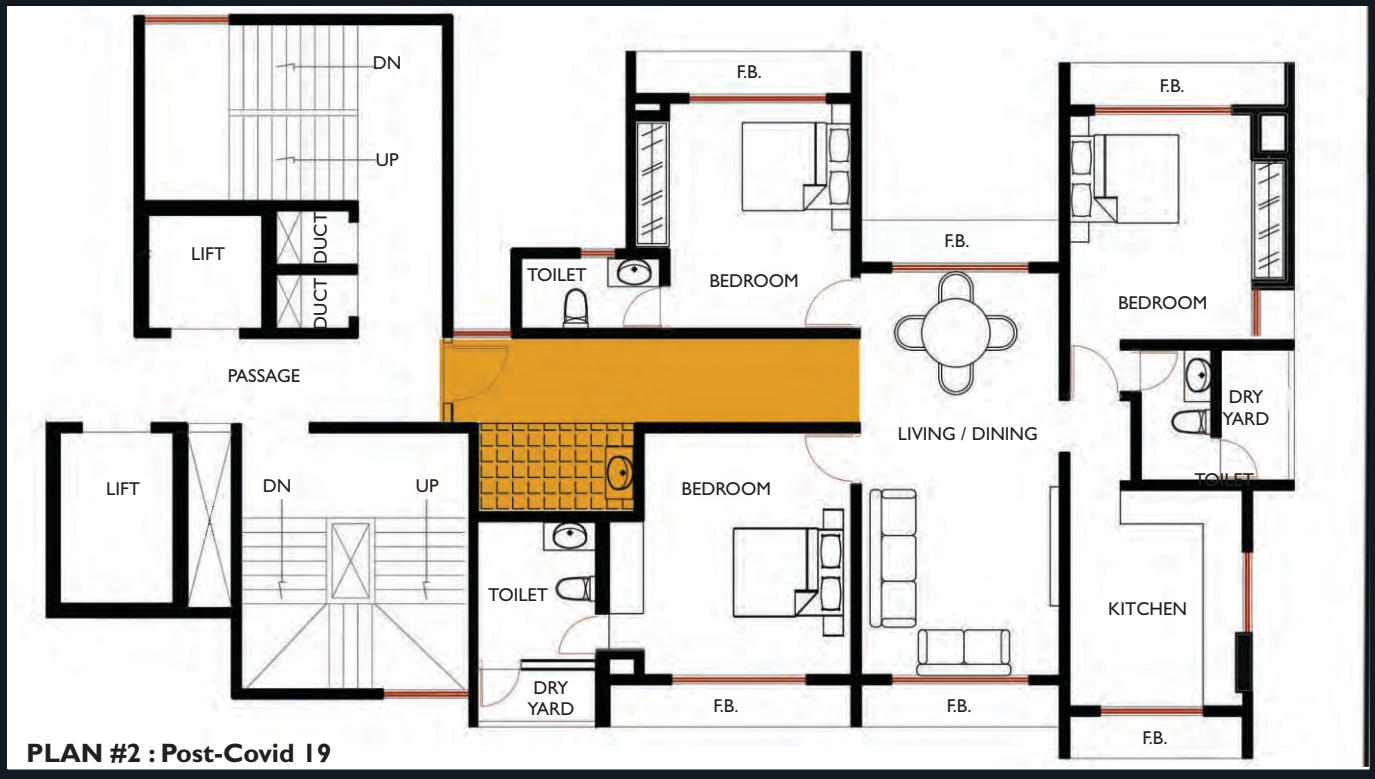
1 DOOR	2 ANTE-CHAMBER	3 RECTANGULAR RM
4 OFFICE	5 FOUNTAIN	6 OPEN COURTYARD
7 RECT. RM	8 CONFER. ROOM	9 ROOM
10 DINING VNDH.	11 TUNNEL	12 KITCHEN
13 STORE	14 STRONG RM	15 MANUSCRIPT STORE
16 MEDICINE RM	17 DELVY. RM	18 TULSI VRINDAVAN
19 HOUSE DEITY	20 KITCHEN	21 DINING VERANDAH
22 WATER PIPE	23 VENTILATION	24 COW SHED
25 SERVANT QTR	26 REAR ENTRY	

6. Regular cleaning and sanitization of restrooms and frequently used spaces.
7. Employee management by shift working or work from home basis to reduce density of people in workspaces.
8. Setting alarms in workspaces as sanitization reminder to wash hands etc. for personal hygiene purposes.
9. Putting up posters or information charts for personal and social hygiene and precautions at frequently used spaces like reception, waiting, dining areas etc.
10. Proper waste management and separate wash area for cleaning of used cleaning objects.

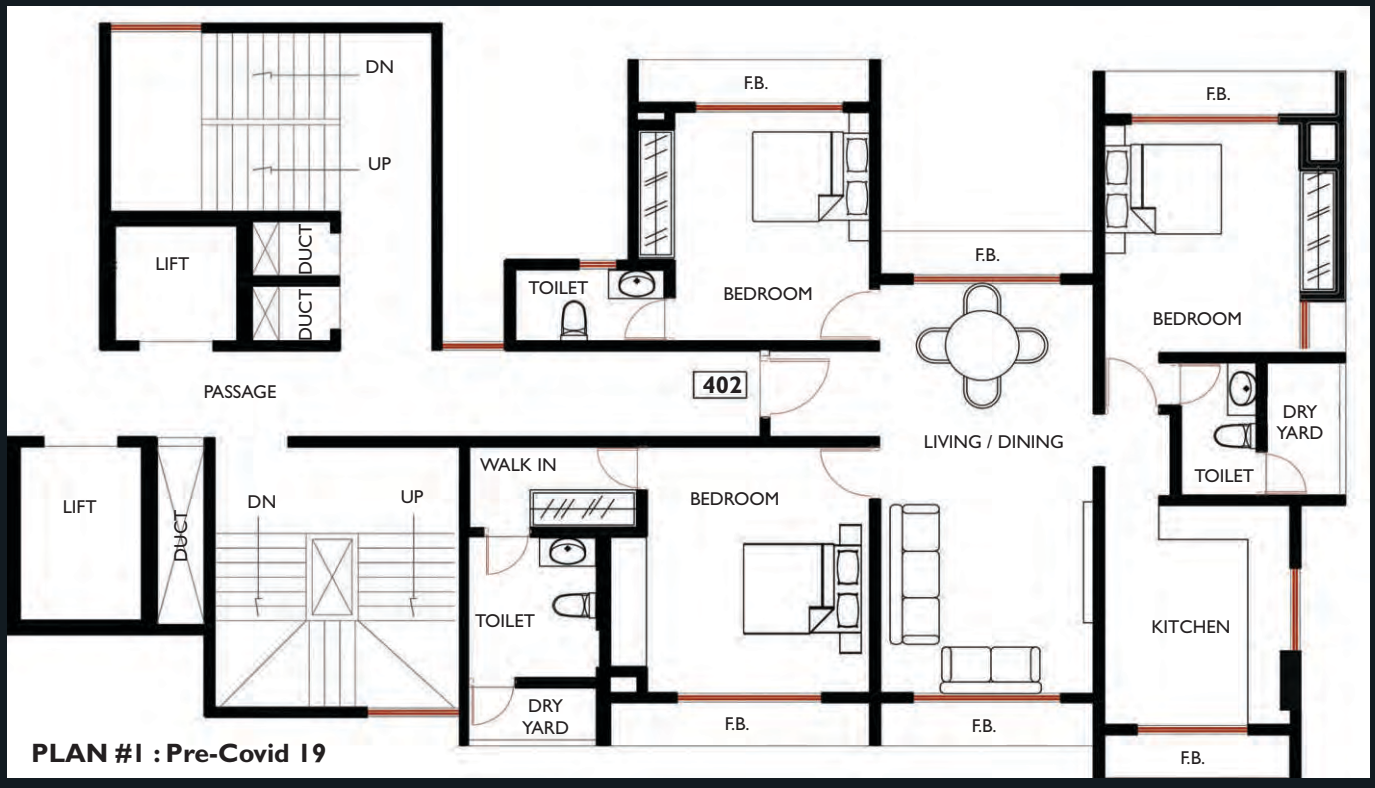


PLAN #1 : Pre-Covid 19

COMMERCIAL DISTANCING: Sharing an example of one of the office spaces designed by me, on how can we rearrange or replan our activities:Picture 1 shows the original plan of a CA's office at Nashik. The hierarchy/ circulation of spaces as seen is the entrance initially leads to the Reception and Waiting area. Master Cabin is placed such as the owner can keep check on the staff and visitors. Workstations are further accompanied by 2 cabins for better working.Picture 2 shows the possible changes which can be made considering social distancing and self-hygiene. Entrance is leading to a small wash area having wash basin and small wash place so as to wash feet etc. before entering the main premises. Also locker room/rack for the visitors/staff for keeping their belongings outside the main premises is provided. Workstations having minimum distance



PLAN #2 : Post-Covid 19

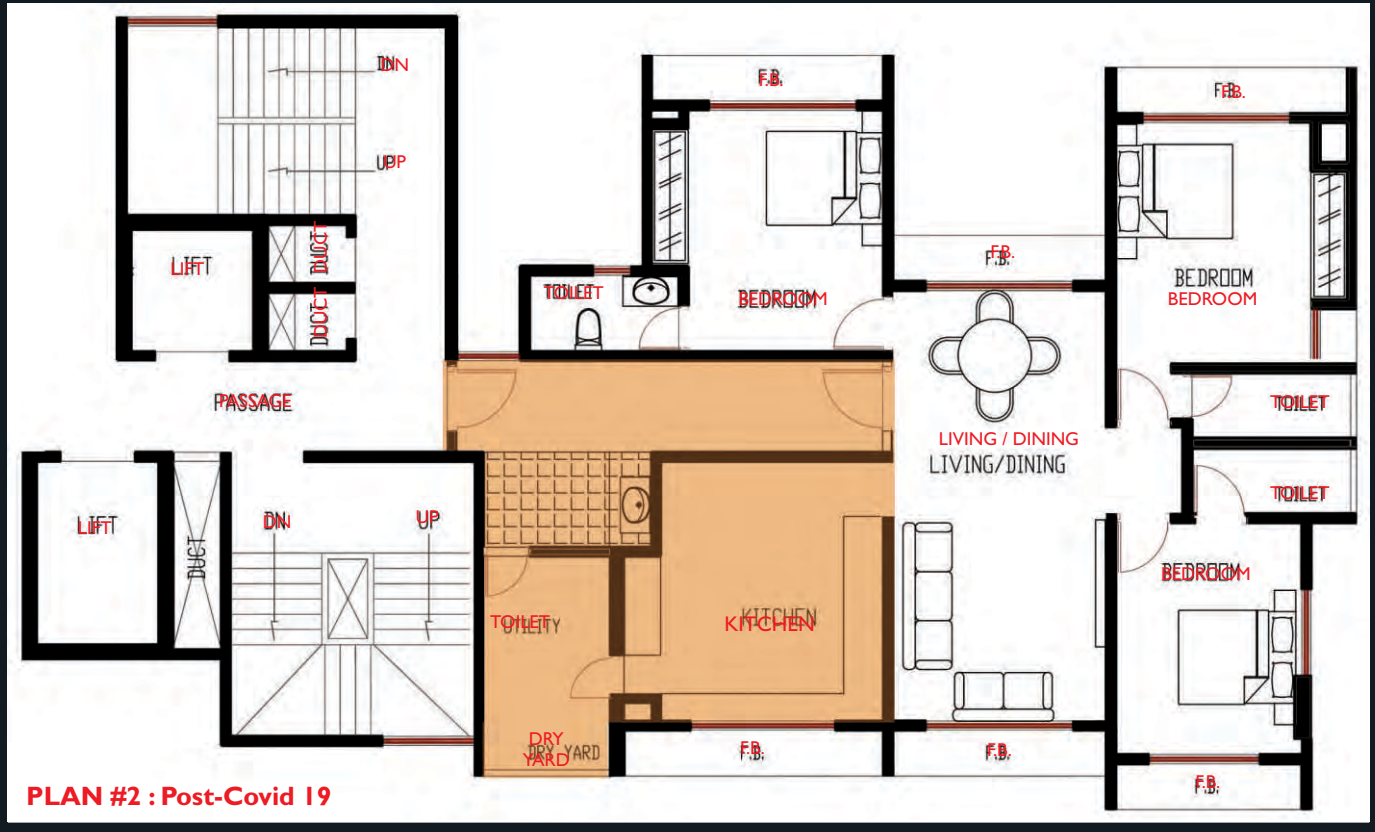


PLAN #1 : Pre-Covid 19

between two chairs up to 3 feet, cabins having visitors chairs at distance of 3 feet from each other. This is just a small example of things we can practice.

No one can challenge nature but as designers we can redesign our spaces to try to reduce the foul impacts of any type of crisis. So now let's puzzle up the past-n-present planning features for concluding solutions!

1. Including wash areas near entrance inspired from wada systems.
2. Wherever the above is not possible: mirroring the



PLAN #2 : Post-Covid 19

Picture 1: Pre COVID_19

utility areas from former wada type planning and bringing the same near entrance for hygiene reasons like sanitisation of anybody entering the premises, minimum circulation of maids for household chores into the premises.

3. Maintaining social distancing and privacy like the soul of former plans which showed the pattern that they segregated the guest area or public area from private. Including an extra room convertible to guest/store/study must be practised in all cases for maintaining the same.
4. In current Planning patterns where buildings are planned for multi-family residences, it is difficult to intrude chowks like wadas'; so increasing the window sizes to maximum possible from case to case could be practised for keeping the spaces well ventilated so that for minimum survival of any kind of viruses.
5. Adding quarantine-space near entrance for any products / goods bought into the home before use.
6. Adding Separate rack/store near entrance for guests'/visitors' belongings so as to avoid taking inside the any premises.
7. Changing sofa cushions to removable covers so as to be washable for maintaining hygiene in living/public areas.

Self-care and hygiene accompanied by the factors mentioned in this article could be one of the important elements to tackle and survive through such situations. ■

ARCHITECTURAL SOLUTIONS TO OCEAN DEGRADATION BY PLASTIC WASTE

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ABSTRACT

According to scientists, oceans will house more plastics than fish by 2050. Ocean degradation is one of the most crucial environmental crisis which needs attention. This paper will address how its an opportunity and responsibility for architects who can make use of the abundant material lying in the ocean : Plastic.

This paper focuses on extraction of plastic waste dumped in oceans and it's re-utilization, into and as a new building material. Various methods of their innovative re-use in the building construction industry are summarized through certain case. Finally, recommendations are presented determining the usability of mentioned techniques, need for new techniques and the type of government support required.

KEYWORDS : Plastic, Waste, Ocean

Figure#1: Plastic suffocating marine wildlife (Source : Sea Shepherd)

Ø INTRODUCTION

We made plastic. We depend on it. Now we're drowning in it.

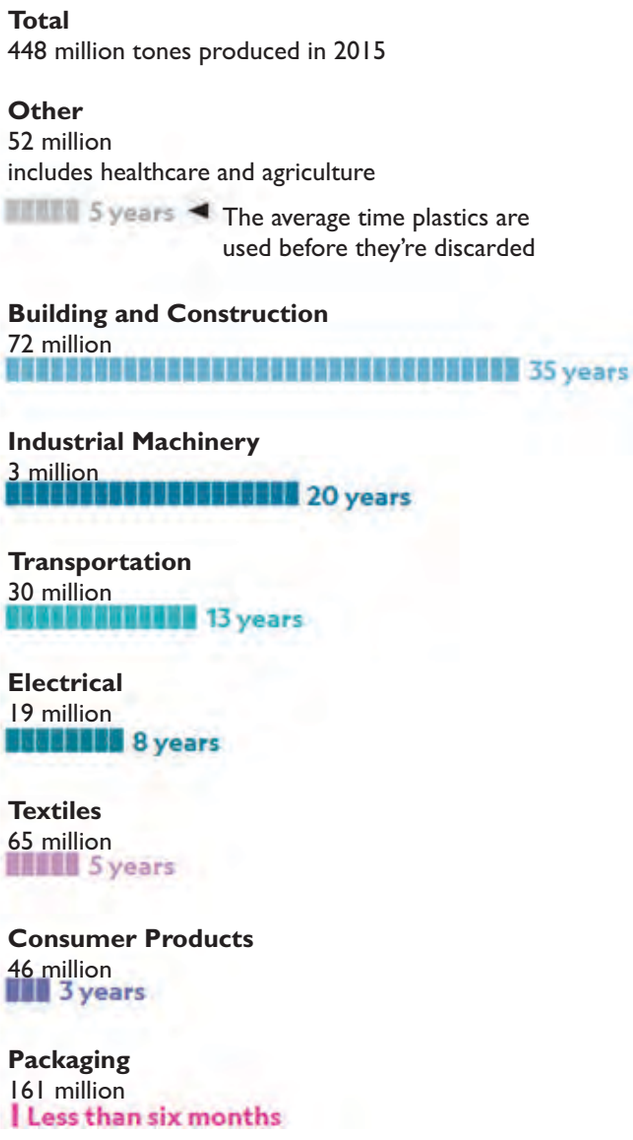
About 44% ie almost half of all plastic ever manufactured has been produced since 2000. Since the year 1950, 8.3-9 billion metric tonnes of plastic has been produced globally — equivalent to more than four Mt Everests of waste. A whopping 79% of all plastic produced since 1950 is still in the environment.

Plastic was not the evil when it was invented. Since helping the Allies win World War II— nylon parachutes or lightweight airplane parts—plastics have transformed all our lives mostly for the better. They've eased travel into space, revolutionized medicine, lighten every car and jumbo jet today, saving fuel—and pollution. They extend the life of fresh food and deliver clean drinking water to poor people in those now demonized disposable bottles, plastics save lives daily. In the mid-1800s, piano keys, billiard balls, combs, and all manner of trinkets were made of a scarce natural material: elephant ivory. The elephant population was at risk and ivory expensive and scarce. Celluloid spared at least some elephants. But today, 10% of global waste is plastic.

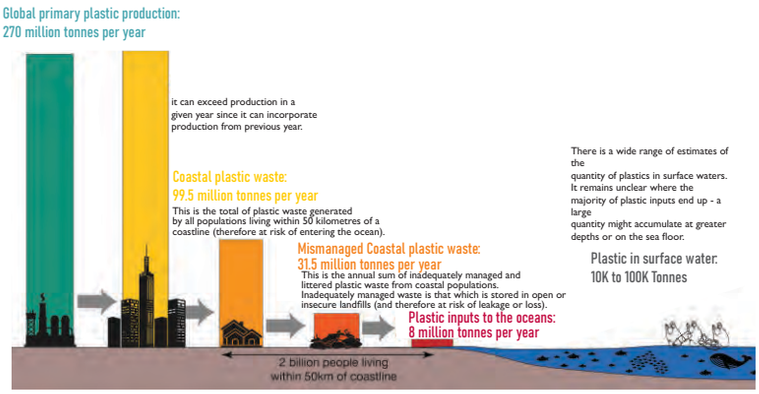
To which industries and products is primary plastic production allocated? Packaging is the dominant use of primary plastics, with 42% of plastics entering the use phase while Building and construction is next at 19%. But primary plastic production does not directly reflect plastic waste as it is also influenced by the polymer type and lifetime of the end product. Packaging, for example, has a very short 'in-use' lifetime (typically around 6 months or less). This is in contrast to building and construction, where plastic use has a mean lifetime of 35 years.

Main issue is mismanaged usage without proper disposal techniques. India #12 as country with most mismanaged plastic waste and Ganges river #2 as world's most polluted river contributing in global ocean pollution.

Ocean plastic is estimated to kill millions of marine animals every year throughout : Entanglement, Ingestion and Interaction. For human health, it is the smallest particles which can be ingested : orally through water, consumption of marine products which contain microplastics, through the skin via cosmetics (unlikely but possible), or inhalation of particles in the air. Contamination can also result in direct financial costs, from costly clean-up efforts for beaches of high aesthetical recreational value, to revenue losses from impeded tourism.



Figure#1: Plastic produced by sectors with its respective life-span (Source : Ronald Geyer, University of Columbia)

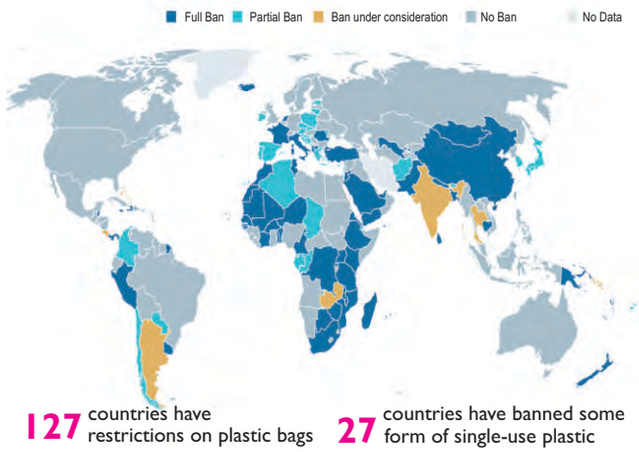


Figure#3: Pathway by which Plastic Enters the World's Oceans from Land based Sources, 2010 (Source : ourworldindata.org)

Ø INITIATIVES

Government Initiatives :

Globally, countries are striving to achieve 100% ban on plastic bags but few have been successful. Stricter implementation of laws on recycling of plastic has also been done, especially in India where Prime Minister Narendra Modi would try to "phase out" single-use plastic by 2022 from the country.



Figure#4: Plastic Bag Bans by Countries(Source: UN Environment Program)

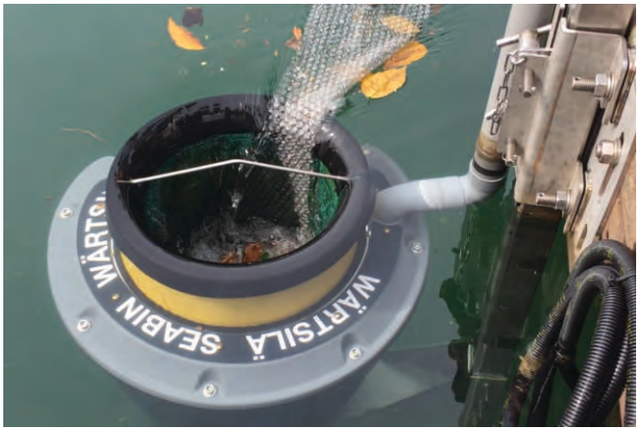
Ocean Cleaning Initiatives :

a. Ocean Cleanup : 2,000-foot-long, U-shaped buoyant debris collector called "System 001," which incorporates floating modules and a 10-foot-tall skirt to trap debris waste.

b. The SeaBin is a bucket with a pump and water filtration system that is designed to suck debris from any marina or dock. If there was rubbish bins on land, why not in the water.

Waste-to-Worth Initiatives in India :

1. Replacing 10% of sand in concrete with waste plastic (The University of Bath-led)



Figure#5: System 001 and SeaBin (Sources: oceancleanup.com and seabinproject,com

2. Bottle Wall Masonry Construction (Manav Sadhana Activity Centre, Ahemdabad)
3. Roads built from plastic (Prof Rajagopalan Vasudevan)
4. Construction bricks made entirely out of plastic waste (PlastiQube)
5. House of plastic in Hyderabad (Prashant Lingam)

Waste-to-Worth Initiatives around the Globe :

1. Recycling waste plastic into construction products such as paving bricks, paving tiles, hatch and manhole covers (G-Jenge Makers, Ltd, Nairobi)
2. Ocean plastic into durable construction blocks (ByFusion, US)
3. Transforms recycled plastics into affordable houses for low-income families (EcoDom, Mexico)

Ø CASE STUDIES OF STRUCTURES IN INDIA

A. Samarpan School, New Delhi (Mr. Patrick San Francesco)

- Plastic Element – Walls and Flooring of 6000 PET bottles
- Technology Involved - Bottles filled with mud or sand and recapped, to be used as a solid, everlasting brick. Replaced steel in the RCC slab with Nylon-6 fish net for tensile strength. Finally, plastered and painted
- Concept - Initiative of low cost learning centre in a slum to educate the youth
- Adaptivity - Earthquake prone areas, affordable housing, providing basic necessities in slum areas, etc.

B. Manav Sadhana Community Centre, Ahmedabad (Ar.Yatin Pandya)

Figure#6 (a) (b) (c): Samarpan School construction details and facade (Source : Youtube and Author)

- Plastic Element – Partition walls of PET bottles and Roofing of Fiber Recycle Plastic
- Technology Involved - Empty bottles are cleaned and filled with flyash or waste residue. Bottles are laid in horizontal courses over a cement mortar bed. Stage pavilion on the roof terrace is made up of light weight Fire Reinforced plastic but is strengthened as well as brightened up with colorful cloth rags sandwiched within FRP
- Concept - Small attempt of recycling municipal/domestic waste into building materials. Being located amidst the largest squatter settlement, it is an epitome of integrated architectural design of multiuse centre.
- Adaptivity - These environmental friendly components can be used in any building especially with economic constraints and in unprofessional flexible environment

Ø ANALYSIS

All the above elaborated cases have their own architectural solutions to plastic pollution prevalent at this time. But the common aspects of reducing plastic waste, providing a cost-effective method of construction, solving the problem of inadequate housing, bioclimatic structures and spreading awareness have been the objectives of all the discussed projects. Yet, their adaptivity and longevity for further advancements and magnitude of scale at which these prototypes can be used is variable. What each of these companies has done is take a daunting global challenge and turn it into an opportunity for disruptive innovation and human progress. After all, as Peter Diamandis points out, "The world's biggest problems are the world's biggest business opportunities." While plastic waste is definitely a problem, it is also an opportunity for innovative problem-solving. At the end, architects, students, and all sorts of creative designers are coming up with such innovative ideas is commendable and shall be encouraged. Various design strategies are discovered but only the one which truly addresses the primary need to the best of its capability will be most fruitful for our future.

Figure#7: 3D and Plastic elements of Manav Sadhana (Source : Author)

Ø CONCLUSIONS

The growth of plastic production has far outstripped the ability of waste management to keep up: That's why the oceans are under assault. In India, rapid urbanization and uncontrolled growth rate of population are main reasons for MSW to become an acute problem. Thus population control, production control and sound waste management systems are basic solutions. Being the second largest population in the world, an initiative by all the Indians will reflect noticeable changes for the betterment of our future and the future generations to come. ***"Be the change you want to see"***.

Plastic is so widely used because it is cheap, versatile, and requires relatively little energy, water and land to produce. To achieve wide uptake of alternatives across countries of all income levels, breakthrough alternatives will have to be economically competitive with current methods. Functionality, price and scalability of innovations are key to addressing this challenge.

The projects mentioned earlier also represent how one global challenge can have many layers of solutions, taken from different angles by different stakeholders, such as startups, non-profits, and activist groups. Like many of the threats that face us, they demonstrate how true progress comes not just from leveraging exponential technologies, but also from collaboration, education, and systemic legislative change.

Ø RECOMMENDATIONS

Ocean Conservation

If we want to rapidly reduce the amount of both macro- and microplastics in our oceans, there shall be three priorities : *Number one* — we must stop plastic waste entering our waterways as soon as possible. Most of the plastic that ends up in our oceans does so because

of poor waste management practices – particularly in low-to-middle income countries; this means that good waste management across the world is essential. *Number two* — we have many decades of legacy waste to contend with. This means we have to focus our efforts on recapturing and removing plastics already in our offshore waters and shorelines using SeaBins and Ocean Cleanup (if successful). *Number three* – the captured plastic should be repurposed in the best possible way.

But certain challenges are to be taken care of : Some of the marine areas are beyond national jurisdiction, which could complicate decisions and actions. While clean-up activities are good tools for raising awareness, they are not a long-term solution and are a very costly end-of-pipe approach.

Waste to Worth Initiatives

All the innovative ideas discussed have scope of being used more progressively in the near future. The most viable ways in which plastic can be re-used are :

Structurally (Mixed with concrete to increase strength and Plastic Blocks /Bricks /Lego)

External (Façade, Roofing, Tiles, Windows and Insulation)

Other Than Building (Roads, Pavilions, Furniture, Fencing, Pergolas / Sheds)

Even though research on the effective use PET in developing as a new material option, solutions exploring the application of PET bottles as structural members, foundation, retaining walls and secondary elements like street furniture, road dividers, pavements and other landscape elements is to be looked in to as it has been proven that the use of plastic bottles as innovative materials for building can be a proper solution for replacement of conventional materials.

Pradhan Mantri Awas Yogna and other government schemes should incorporate plastic waste as the construction material and in all possible design aspects to provide affordable housing. The Governing bodies shall formulate policies to propagate this eco centric approach via appropriate practices, research investigations on the properties of the materials and construction techniques.

Government and Policy – Makers

Restrict high-income countries from exporting their recyclable plastics to mid- and low-income countries where poor waste management infrastructure has led to high level risk of waste entering the ocean and if trade is maintained, mid- or low-income countries should tax the plastics they accept. These taxes should be used to expand and improve waste management infrastructure.

An estimated 20% of ocean plastic pollution results from the fishing industry. Implementing and monitoring of strict regulations on fishing activity for prevention of waste is important not only at national levels but through regional and global cooperation.

The majority of plastic enters the ocean as a result of inadequate waste management; open landfills and dumps can't effectively prevent plastics from being lost to the environment. Improving waste management infrastructure – particularly across industrializing countries – is critical and urgent if we are to prevent and reduce plastics entering the ocean.

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Relevance of Art in Architecture

- Ar Anjali Vhatkar

Anjali Vhatkar, the founder & CEO of Elaura Art Gallery, is an architect and an established gallerist in Mumbai. She specializes in Indian styles of paintings which mainly includes Gond tribal paintings, Pichwais and Tanjore paintings. Using natural pigment colors in these paintings fascinates her and motivates her to learn about old mediums used in earlier days and experiment with it.

Elaura Art Gallery is a futuristic way to provide a simple and convenient way to view a collection of over 600 original artworks done and certified by professional artists. Elaura offers artists a platform to display and sell their artworks with latest technical infrastructure relevant to today's digital world. We counsel and train artists about other supporting skill sets they need to develop like how to write about their work, basics of book keeping and the legal aspects etc. We help them become a financially stable artist.

art and architecture have a deep connection that unites themthrough design, the designerand the individual purpose. Both are created using the same organizing principles, the same visual fundamentals and the same composition of the senses. They are expressive and communicative at the same time.

The artist "shapes" an object to visually express a set of ideas, and the audience receives that expression. Architecture, sculpture and painting once belonged together for a very long time in the European Gothic, Renaissance, and Baroque periods.

Art works, in any form, be they paintings, murals, mosaics, relief works or sculptures can be crafted for public spaces. Local stories provide specificity to larger and more general themes and issues, allowing the artwork to become a focal point of shared memories or objectives. People thus become active motivators of the building rather than passive clients and the process of engagement may contribute to public responsibility, ownership and the prevention of damage to surrounding.

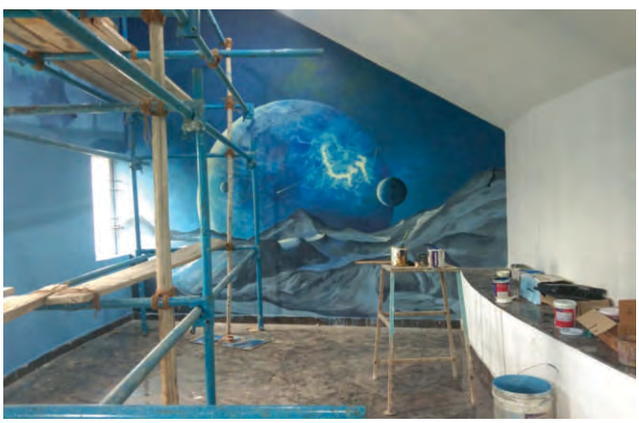
INFLUENCE OF ART ON HUMAN The human mind consistently needs stimuli from new ideas, new processes of doing things as well as a whole new approach that will help human beings to accept and live with each other with understanding, empathy and harmony.

We are moving towards a dominantly digital world, where most of the work will be taken care of by machines. At one point we will need to prove our superiority over machines. That's where Art, in every form, comes into the picture. We need to stay well connected to our art, culture, lifestyles and languages. We need to ensure to inherit it to the next generations responsibly as it has taken thousands of years to develop and mature to reach where it is now.

Art and culture are one of the most dynamic phenomenon and norms that can trigger or catalyse change in human behaviour change. It is able to deepen empathy, trigger reflection, increase dialogue and help generating new ideas. These important factors are often neglected by the stake holders.

INDIFFERENCE TOWARDS ART Too often, clients, after spending lakhs and crores of rupees on interiors, sometimes seek artwork on a small budget and want to "just fix the issue" of selecting artwork by quickly choosing it, done by any amateur artists in their close circle. There has to be a reason for this.

We see people around us buying cell phones, expensive watches, sometimes tv or a car every 2-3 year as



they see others doing the same, but when comes to an artwork, probably most people haven't seen anyone buying an artwork, so getting inspired and encouraged by someone doing the same is a rare case, and of course the myth that owning good artwork can only be afforded by royal families and super rich people strengthens this feeling even more.

Clients, sometimes even designers, are not aware of the difference between amateur artists and professionally trained or qualified artists. Architect or interior designer, after lots of hard work done on a project for months or years together, in the last leg of project, sometimes find it difficult to interfere into clients' painting selection process.

UNITED NATIONS COVID-19 RESPONSE

Courtesy: World Health Organisation

All architects and interior designers who are able to cross all this hurdle, have marked their style, uniqueness, charm in their designs and have successfully made the experience of incorporating art in decor more inclusive. Its natural to them to brings out fresh ideas, concepts, expressions to their designs very often as art is continuously evolving like a new life.

By introducing art in any form, paintings, murals, sculptures, you have an opportunity to create a place that holds and shows a part of you. It adds colours, elements, forms and mainly lends an identity to your space. Great piece of wall art offers you right kind of focal point in your interiors and gives the viewer a sense of what to expect. Artwork helps to break monotonous surface areas and most importantly adds life to space.

Art is powerful enough to transform ordinary spaces into very impressive, special ones. It is an essential and primary component that matters most in the interior design.

We really need to re-frame our mind-set when it comes to buying an artwork or suggesting it to our clients. Better understanding of this subject is going to make a huge difference to our artists, their families and the overall art industry.

In the current COVID-19 crisis, we sit in our safe spaces trying to keep despair at bay, when we look around us, we realize that we can only turn towards various forms of art to spend our time and save our sanity. On the other hand, art has now taken a backseat to other pressing needs, art does not hold its merited place in the list of necessities. It is affecting basic required living standards of our artists.

Buying artwork means that money continues to flow into the grassroots of art and culture and allow them to continue with their creative processes. I know for sure that it will benefit all of us in the long run.

All Images by: Author

SOURCING OF ARTWORK – FROM AN AMATEUR ARTIST OR A PROFESSIONAL ARTIST?

Not having studied art, most amateur artists adopt a completely different approach to art. Most commonly it is their part time or a leisure activity. They lack some or all-important qualities in their artwork like good content, depth in their approach, originality, interest, balance, understanding, exploring and controlling different mediums. Most of them are not aware that taking formal training at any stage or age will accelerate their learning and performance too a great extent.

Art education offers a perfect opportunity for artists to explore various media, styles and techniques under the guidance of a trained mentor. Over the course of several years, art students cultivate their creative talents and develop their style to perfection. Their work is continuously observed and methods and technical skills are refined by well qualified teachers.

ROLE OF A GALLERY

Galleries play an essential role in the development and promotion of visual art. The value addition they offer to your space through artwork is, upgrade your decor style, create good ambience and most importantly add great content to the space that helps to motivate people to relate with each other in a positive manner. It helps client to select the right painting to create the right ambience for which the space has been designed.

Galleries verify and offer original and certified artworks made with artist-grade brand materials by qualified artists.

Galleries can also guide you on framing a painting tastefully, complementing its content as also for restoring precious pieces of old artefacts to their original glory.

Thus, in conclusion I would appeal all designers to give Art its due importance by procuring artworks and boost our immensely talented artists in these difficult times. ■

UNITED NATIONS COVID-19 RESPONSE

Courtesy: World Health Organisation

WELCOME NEW MEMBERS

18TH COM DATED 22ND FEBRAURY, 2020 HELD AT IIA HO, MUMBAI

ASSOCIATE MEMBERS ELECTED AS FELLOW MEMBERS OF THE INSTITUTE

Sr. No.	Name	Memb. No.	Place
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2	Ar. Ramanarao Sahukari	F16221	Visakhapatnam
3	Ar. Mohmad Amin Wani	F16037	Jammu & Kashmir
4	Ar. Sumit Aggarwal	F17192	Uttarakhand
5	Ar. Lavesh Kansal	F13966	Faridabad
6	Ar. Atul Singla	F19290	Punjab
7	Ar. Nagendra Narayan	A16126	Punjab
8	Ar. Naresh Kumar Chandola	F23058	Uttarakhand
9	Ar. Sanjay Kumar Singh	A23055	Uttarakhand

MEMBERS ELECTED AS DIRECT FELLOW MEMBERS OF THE INSTITUTE

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2	Ar. Vikas Sabharwal	F23772	Gurgaon
3	Ar. Ainsley Lewis	F23773	Mumbai
4	Ar. Ajay Gautam	F23774	Faridabad
5	Ar. Sumit Agarwal	F23775	Barelilly

MEMBERS ELECTED AS ASSOCIATE MEMBERS OF THE INSTITUTE

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4	Ar. Gautam Tewari	A23779	New Delhi
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7	Ar. Kumar Pratyush	A23782	New Delhi
8	Ar. Twinkle Aggarwal	A23783	Haryana
9	Ar. Sanket Vats	A23784	Uttar Pradesh
10	Ar. Ravi Pratap Singh	A23785	Uttar Pradesh
11	Ar. Sudhanshu Marandi	A23786	Jharkhand
12	Ar. Satya Charan Ganesuni	A23787	Andhra Pradesh
13	Ar. Ramadasa Prabhu	A23788	Karnataka
14	Ar. Leslie Dias	A23789	Karnataka
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37	Ar. Shreya Sachchidanand Sunita Mahajan	A23812	Aurangabad
38	Ar. Aniket Arvind Minal Wadke	A23813	Mumbai
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40	Ar. Brijesh Janakkumar Mistry	A23815	Vadodara
41	Ar. Diksha Shivlal Tank	A23816	Vadodara
42	Ar. Sippy Akansha Manher	A23817	Raipur
43	Ar. Shalabh Kumar Sharma	A23818	Raipur
44	Ar. Swati N Dixit	A23819	Durg Bhilai
45	Ar. Deepesh Verma	A23820	Raipur
46	Ar. Sonam Thakur	A23821	Raipur
47	Ar. Sitaram Meena	A23822	Rajasthan
48	Ar. Kapil Shyam Intodia	A23823	Udaipur
49	Ar. Pragati Soni	A23824	Udaipur
50	Ar. Harshit Choubisa	A23825	Udaipur
51	Ar. Anup Surana	A23826	Rajasthan
52	Ar. Shreya Vistasp Kharas	A23827	Mumbai
53	Ar. P R Bheemalingeswara Rao	A23828	Visakhapatnam
54	Ar. Divin K Chiramel	A23829	Ernakulam
55	Ar. Lijinkrishnan K	A23830	Kerala
56	Ar. Ashish Upadhyay	A23831	Madhya Pradesh
57	Ar. Sunny Gulati	A23832	Panchkula
58	Ar. Sushmita	A23833	Bihar
59	Ar. Sreekesh P. S.	A23834	Trivandrum
60	Ar. Melba Rose	A23835	Thrissur
61	Ar. Jaim G. Koippallil	A23836	Kottayam
62	Ar. Alka Kumari	A23837	Bihar
63	Ar. Jennifer Thomas	A23838	Kollam
64	Ar. Amandeep Sharma	A23839	Amritsar
65	Ar. Dinesh Kumar	A23840	Amritsar
66	Ar. Anirudha Suryakant Adivarekar	A23841	Pune
67	Ar. Neeraj Jojo	A23842	Kerala
68	Ar. Meghna Leo	A23843	Kerala
69	Ar. Muhammed Rishan K P	A23844	Kannur
70	Ar. Yadhu Sankar P	A23845	Kerala
71	Ar. Ajay Thomas	A23846	Kerala

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72	Ar. Vishal Jain	A23847	Ludhiana
73	Ar. Priyanka Kamboj	A23848	Punjab
74	Ar. Kevin Abraham George	A23849	Trivandrum
75	Ar. Gokul Goyal	A23850	Hisar
76	Ar. Mukesh Kumar	A23851	Hisar
77	Ar. Harcharan Pappu	A23852	Andhra Pradesh
78	Ar. Arobindo Gupta	A23853	Karnataka
79	Ar. Amith B K	A23854	Mangalore-Manipal
80	Ar. Mohammadharis A Mulla	A23855	Karnataka
81	Ar. Nishit Shah	A23856	Karnataka
82	Ar. B Vijayakumar	A23857	Coimbatore
83	Ar. Jaykrishnan Achuthan Pillai	A23858	Nagpur
84	Ar. Priyanka Mehta	A23859	Jodhpur
85	Ar. Deepti Choudhary	A23860	Jodhpur
86	Ar. Neharika Rajkumar Kothari	A23861	Jodhpur
87	Ar. Ankush Lodha	A23862	Jodhpur
88	Ar. Kritika Sharma	A23863	Jodhpur
89	Ar. Pratibha Jangid	A23864	Jodhpur
90	Ar. Deepak Khandelwal	A23865	Udaipur
91	Ar. Niharika Pareek	A23866	Jodhpur
92	Ar. Sneh	A23867	Karnal
93	Ar. Tom T Thomas	A23868	Kerala
94	Ar. Abhijit Jayant Swati Sahasrabudhe	A23869	Navi Mumbai
95	Ar. Manuj Gangabisan Mundhada	A23870	Nagpur
96	Ar. Rupesh Rajaram Rajashree Soshte	A23871	Kalyan
97	Ar. Siddhesh Shirish Swati Nachane	A23872	Thane
98	Ar. Achyut Gupta	A23873	Punjab
99	Ar. Srikanth S V	A23874	Karnataka
100	Ar. Pottavathini Prithvi Raj Kumar	A23875	Telangana
101	Ar. Amith Sanjay Rao	A23876	Navi Mumbai
102	Ar. G Tamilmaran	A23877	Madurai
103	Ar. Bhavya Guglani	A23878	Gurgaon
104	Ar. Angad Avichal Kasliwal	A23879	Indore
105	Ar. Ishan Udayan Natu	A23880	Indore
106	Ar. Kabir Thakkar	A23881	Indore
107	Ar. Vipul Patel	A23882	Indore
108	Ar. Surabhi Kumari	A23883	Jharkhand
109	Ar. Ananya Asthana	A23884	Uttar Pradesh
110	Ar. Mansi Jain	A23885	Raipur
111	Ar. Akshat P. Runiwal	A23886	Rajasthan
112	Ar. Prachi Dahlan	A23887	Rajasthan
113	Ar. Haider Jamal Khan	A23888	Rajasthan
114	Ar. Jayanthi C H	A23889	Visakhapatnam
115	Ar. Subhranil Samanta	A23890	West Bengal
116	Ar. Bodhan Majumdar	A23891	West Bengal
117	Ar. Neeraj Hemant Mahajan	A23892	Pune
118	Ar. Abhishek Lahoty	A23893	Assam
119	Ar. Preeti Kulharia	A23894	Jodhpur
120	Ar. Vaibhav Kulshrestha	A23895	Uttar Pradesh
121	Ar. Juwairia Qamruddin	A23896	Uttar Pradesh
122	Ar. Jaya Srivastava	A23897	Uttar Pradesh
123	Ar. Sujoy Sarkar	A23898	West Bengal
124	Ar. Amrutha Kishor	A23899	Kottayam
125	Ar. I G Faizunsha	A23900	Karnataka
126	Ar. Nivethitha V	A23901	Coimbatore
127	Ar. Dustagir Hussain M	A23902	Madurai
128	Ar. Praveen Alva	A23903	Karnataka
129	Ar. Prathik M Pishe	A23904	Karnataka
130	Ar. Umesh Sharma	A23905	Punjab
131	Ar. Tahir Amin Wani	A23906	Jammu & Kashmir
132	Ar. Abdul Basit Mohammad Amin Sayeeda Shaheen Wani	A23907	Jammu & Kashmir
133	Ar. Imroz Khosa	A23908	Haryana
134	Ar. Meera Jayakumar	A23909	Thrissur
135	Ar. Satpal	A23910	Sonepat
136	Ar. Neeti	A23911	Sonepat
137	Ar. Manish Saini	A23912	Sonepat
138	Ar. Aakash Deep Verma	A23913	Sonepat
139	Ar. Mohit	A23914	Sonepat
140	Ar. Gyanendra Grewal	A23915	Sonepat
141	Ar. Naveen Dhamija	A23916	Sonepat
142	Ar. Neha Yadav	A23917	Sonepat
143	Ar. Ankush	A23918	Haryana
144	Ar. Paras Dhingra	A23919	Sonepat
145	Ar. Sakshi Gahlawat	A23920	Sonepat
146	Ar. Deepika	A23921	Sonepat
147	Ar. Shubhi Bhatnagar	A23922	Sonepat
148	Ar. Hardeep	A23923	Sonepat
149	Ar. Shivam Chandna	A23924	Sonepat
150	Ar. Sajal Bhatnagar	A23925	Sonepat
151	Ar. Ankit Kumar	A23926	Sonepat
152	Ar. Karan Lakhee	A23927	Sonepat
153	Ar. Monark Batra	A23928	Sonepat
154	Ar. Ramakant	A23929	Uttar Pradesh
155	Ar. Kunwar Ghanshyam Yadav	A23930	Uttar Pradesh
156	Ar. Nilotpal Nath	A23931	Assam
157	Ar. Arputa Jayasheela M. A.	A23932	Pune
158	Ar. Jinu J Varghese	A23933	Kollam
159	Ar. Sudheer D V	A23934	Karnataka
160	Ar. Sham Salim	A23935	Kerala
161	Ar. Mohammed Aslam Karadan	A23936	Kerala
162	Ar. Sephali Padhy	A23937	New Delhi

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163	Ar. Nikhil Hasmukh Jain	A23938	Pune
164	Ar. Himanshu Pradeep Deshpande	A23939	Aurangabad
165	Ar. Mahesh Mohan Shaila Mali	A23940	Satara
166	Ar. Sunil Dadaso Jadhav	A23941	Sangli
167	Ar. Deependra Kumawat	A23942	Rajasthan
168	Ar. Digvijay Singh	A23943	Rajasthan
169	Ar. Sunil Kumar Saini	A23944	Rajasthan
170	Ar. Jyotirmoy Deb	A23945	Assam
171	Ar. Ashish Bhawnani	A23946	Chattisgarh
172	Ar. Saurabh Kaushik	A23947	Chattisgarh
173	Ar. Shraddha Dewangan	A23948	Raipur
174	Ar. Hima Raichura	A23949	Raipur
175	Ar. Shubham Ghatge	A23950	Raipur
176	Ar. Nitin Khandelwal	A23951	Raipur
177	Ar. Ayushree Khanna	A23952	Bilaspur
178	Ar. Diksha Chandrakar	A23953	Raipur
179	Ar. Surbhi Sahu	A23954	Raipur
180	Ar. Shubhada Mahobia	A23955	Raipur
181	Ar. Vastu Parakh	A23956	Raipur
182	Ar. Chitrotpala Niraj Singh	A23957	Raipur
183	Ar. Shwetketu Nachiketa Bhave	A23958	Madhya Pradesh
184	Ar. Ankit Sinha	A23959	Madhya Pradesh
185	Ar. Anmol Jaisinghani	A23960	Bhopal
186	Ar. Nilesh Bamania	A23961	Madhya Pradesh
187	Ar. Dhayanandh M	A23962	Telangana
188	Ar. Arunesh Kumar Mishra	A23963	Uttar Pradesh
189	Ar. Faizan Siddiqui	A23964	Uttar Pradesh
190	Ar. Meinathan N	A23965	Karnataka
191	Ar. Vivek S N	A23966	Karnataka
192	Ar. Feriz Akthar P	A23967	Calicut
193	Ar. Harani R	A23968	Tamil Nadu
194	Ar. Ankush Pathe	A23969	Bhopal
195	Ar. Richa Ankush Pathe	A23970	Bhopal
196	Ar. Aagya Purohit	A23971	Jodhpur
197	Ar. Kavya Sahgal	A23972	Jodhpur
198	Ar. Reetu	A23973	Jammu & Kashmir
199	Ar. Parmod	A23974	Sonepat
200	Ar. Ashutosh Agrawal	A23975	Odisha
201	Ar. Ravinder	A23976	Haryana
202	Ar. Adarsh Kumar	A23977	Bihar
203	Ar. Vijaya Prakash Singh	A23978	Uttar Pradesh
204	Ar. Sahil Pahal	A23979	Delhi
205	Ar. Rishabh Jain	A23980	Gurgaon
206	Ar. Himanshu Phogat	A23981	Sonepat
207	Ar. Shatakshi Agnihotri	A23982	Uttar Pradesh
208	Ar. Saurabh Kumar	A23983	Gurgaon
209	Ar. Abhishek Verma	A23984	Uttarkhand
210	Ar. Bharat Singh	A23985	Uttarkhand
211	Ar. Kapil Kumar	A23986	Uttarkhand
212	Ar. Vedant Jain	A23987	Uttarkhand
213	Ar. Jonish Kumar	A23988	Uttarkhand
214	Ar. Deweshwar Prasad	A23989	Uttarkhand
215	Ar. Pradeep Kumar Kori	A23990	Uttarkhand
216	Ar. Vishakha Agarwal	A23991	Uttarakhand
217	Ar. Shubham Jaiswal	A23992	Uttarakhand
218	Ar. Aditya Singh	A23993	Uttarakhand
219	Ar. Deepak Ahuja	A23994	Uttarakhand
220	Ar. Kiran Kumar	A23995	Karnataka
221	Ar. Niraj Pravin Patel	A23996	Ahmedabad
222	Ar. Priya Parakh	A23997	Durg Bhilai
223	Ar. Hardikkumar Ravibhai Patel	A23998	Ahmedabad
224	Ar. Vivek Chaturbhai Parekh	A23999	Ahmedabad
225	Ar. Harsh Dewangan	A24000	Durg Bhilai
226	Ar. Arnav Malhotra	A24001	Rajasthan
227	Ar. Akash Satish Patil	A24002	Kolhapur
228	Ar. Pramil Prakash Patil	A24003	Satara
229	Ar. Himanshu Bhola	A24004	New Delhi
230	Ar. Rakshit Khanna	A24005	New Delhi
231	Ar. Himanshu Sharma	A24006	New Delhi
232	Ar. Sanchay Jaswal	A24007	Delhi
233	Ar. Rajat Suri	A24008	Delhi
234	Ar. Sanjeev Kumar Gupta	A24009	Uttar Pradesh
235	Ar. Milan	A24010	Sonepat
236	Ar. Gunjan Gangey	A24011	Gurgaon
237	Ar. Raghuraman	A24012	Punjab
238	Ar. Kapil Mudgal	A24013	Uttarkhand
239	Ar. Rishav Chhabra	A24014	Uttarkhand
240	Ar. Inderprakash Arya	A24015	Faridabad
241	Ar. Priya Sharma	A24016	Faridabad
242	Ar. Rahul Singh Bhati	A24017	Faridabad
243	Ar. Priti Dalal	A24018	Faridabad
244	Ar. Ritu	A24019	Faridabad
245	Ar. Anurag Kapoor	A24020	Faridabad
246	Ar. Diwakar Kumar	A24021	Faridabad
247	Ar. Mahipal Singh	A24022	Faridabad
248	Ar. Sanjeev S. K. Sharma	A24023	Faridabad
249	Ar. Mohd Adil Saifi	A24024	Uttar Pradesh
250	Ar. Bhushan Ankush Jagtap	A24025	Pune
251	Ar. Varsha D. Guggari	A24026	Pune
252	Ar. Promod Kumar	A24027	Haryana
253	Ar. Aman Gandhi	A24028	Rajasthan
254	Ar. Ashok Kumar Jangir	A24029	Rajasthan

Urban Form and Resilience to Disaster: Study of Pulicat

- Ar Aashreetha K Vijayrajan - Ar Sailakshmi G - Ar Xavier Benedict

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Abstract

The study of the Dutch coastal city of Pulicat on the Coromandel coast is carried out in this research to understand the relationship of water bodies to its urban-form, which played a major role in the evolution of its built form of the town. Pulicat Lagoon spreads over an area of 759 sq.km. It is the second largest wetland in India located in the north of Chennai city along the coromandel coast. The town hosted Portuguese, Dutch and the British maritime trades from 1502CE, mainly to trade with the cotton weavers or trade with merchants' community. Some of the maritime heritage would be traced in the town today. Last three decades, with rapid industrialization, especially with the development of the ports, thermal-power-plant, this coastal town has been rapidly changing without the required planning corporating the natural and cultural landscape settings. The built-form of Pulicat is illustrated here in the paper to understand the scope of a resilient urban-form which can be used as an example for other major cities along the coast. The paper aims at understanding the urban form of a coastal town and its resilience to natural disasters such as cyclones, floods and tsunami that the eastern coast is prone to.

Keywords: ***Urban form, Pulicat, Natural disaster, Resilience***

Introduction:

Coromandel coast in peninsular India lies in-between the Eastern Ghats and the Bay of Bengal which extends from Machilipatnam, Andhra Pradesh in the North to Point Calimere currently known as Nagapatnam, Tamil Nadu in the South (Stephen, 1997).

The name "Coramandel" is derived from two historical pieces of evidence, according to Henry Davidson, the

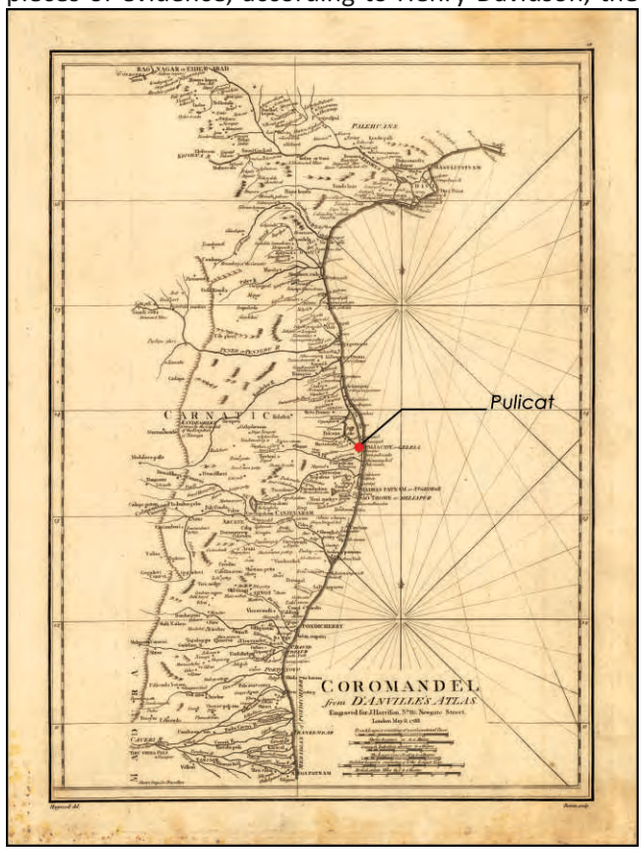

Figure 1: Map of the Coromandel coast, Source: (1788 Coromandel from D'Anville's Atlas)

name has its origin in "*Cholamandalam*" which shows the extent of Chola rule during the 10th century and "*Karu-manal-medu*" which directly translates to black-sand-high-ground. The latter gives a description of the urban form (Edgar & P.G., 1986).

Since cotton was the predominant agrarian cultivation due to the availability of black soil, the settlements here were major of the weavers' community which whereas dependent on the harvest (Stephan, 2014).

The Arabs were the earliest migrants to this land even before the Europeans, after being deported from their home land, as they were considered rebels, they landed on the eastern coast of India. Though they were rice merchants they were not able to establish trade connections in terms of mercantile trade.

The Dutch were attracted to the Coromandel coast of India after the published works of Varthena, an Italian explorer .. They strengthened import and export trading with the West; then they became powerful with the establishment of Fort Geldria and the year-round harbour in the south of Pulicat lagoon at *Pazhaverkadu* (Stephan, 2014).

Natural disasters:

A disaster is an occurrence that disrupts the normal conditions of existence. It causes a level of suffering that exceeds the capacity of adjustment of the affected community (WHO, 2002).

The region witnesses various natural disasters such as flooding due to sudden and heavy spells of incessant rains, saltwater intrusion and storm surges (Figure#2).

Sea erosion occurs in Nagapattinam , Cuddalore , Chennai and Thiruvallur districts and affects the livelihood of the fishing communities ,. Cyclones also occur mainly from October to December. Seismic vulnerability felt due to the presence of a fault line at the Tirukkovilur –Pondicherry fault and the Comorin – Point Calimere Fault has caused moderate earthquakes in the past 200 years as evident from the published literature (Tamil Nadu state disaster Management Authority (TNSDMA), 2018).

In the year 2004, coastal Tamil Nadu witnessed a major natural calamity , the tsunami, during which most of the Coromandel coastal districts in Tamil Nadu were affected . Chennai, Kancheepuram, Thiruvallur, and Cuddalore districts have seen major loss of lives, livelihood and infrastructure. These districts comprise

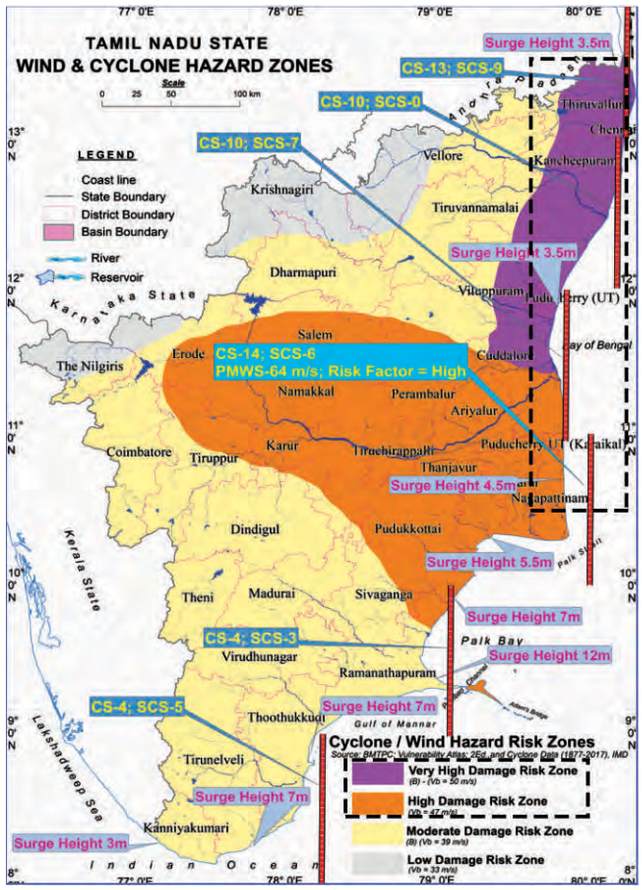

Figure 2:Map showing the damage risk zone on the Coromandel coast in Tamil Nadu, Source: (Tamil Nadu state disaster Management Authority (TNSDMA), 2018)

major cities in Tamil Nadu which have rapidly urbanized in the late 20th century. The unplanned expansion of the cities in the region has led to unjust exploitation of the existing natural geography.

Pazhaverkadu village in Tiruvallur district along with the other settlements by the Pulicat lagoon has experienced the 2004 disaster but the impact has been minimal due to Pulicat lagoon which takes the shocks from every disaster, making these settlements resilient to natural disaster.

Resilience:

Resilience as defined by the UN-Habitat, is the ability of any urban system to maintain continuity through all shocks and stresses while positively adapting and transforming towards sustainability. As risk and urban populations are dramatically increasing, the concept of resilience has gained greater prominence in International development (UN Habitat, n.d.) The urban form of the Indian towns and cities has been well described in their nomenclature as well as during the pre-colonial urban planning methods. As an example, *Periyamedu, a* place in North Chennai , Tamil Nadu ,

translates to high- ground in Tamil (Oorum Perum, 1988).

This is where we have the Chennai Central Railway Station which was logically placed in this region during the British Colonial rule . Also, Vyasarpadi was once a lake which protected Chennai city from flooding (Figure#3).

Western ideologies of planning in India brought by the British during the colonial period were against the natural urban geographical form of the Coromandel coast. The British did not traditionally adapt their riverine system due to freezing temperatures of the

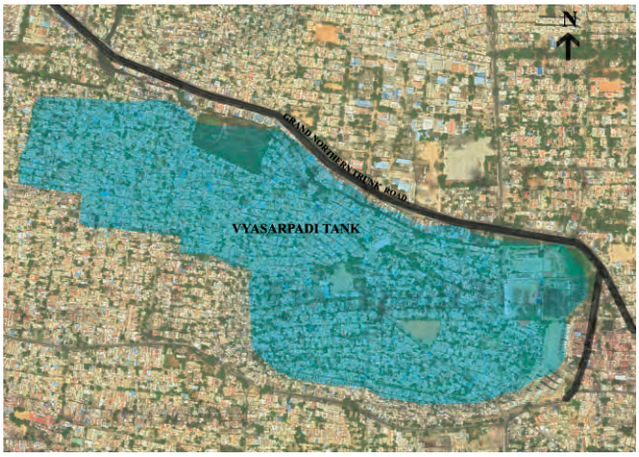

Figure 3: Map showing the Vyasarpadi Tank in present Chennai overlaid on the map from the early 1900- Madras and Environs, Source, (Koonu & Gopi, 2019)

water, making it unusable for navigation. With this mindset, they were not able to appreciate the Indian waterways initially during the British colonial period. They later constructed the Buckingham Canal running along the coast for navigation. This created a major change in the landform of the coromandel coast. In 1898 , British Chief Engineer Russell expressed that the Buckingham Canal was a costly error to have designed a canal on the east coast of South India which was prone to severe floods, soil erosion and siltation. Eventually, the Buckingham Canal went unused for navigation due to siltation.Thus, for a city to be resilient, the natural urban and the geographical form are to be considered and the urban pattern should contextually evolve.

Methodology

An investigative research is undertaken in formulating this paper to understand the relevance of urban form and geographical condition of the place. The literature study gives us the relevance and the importance of the Coromandel coast and its environmental and historical significance. Following this, the site visit to Pazhaverkadu was carried out. During the visit, the streets, building typology and the coastal edge were visually documented .. The localities were interviewed regarding the effects of natural disasters and its impact on the livelihood in the past decade.

The street patterns of present-day map of the Pazhaverkadu region and vestige maps of the old Dutch settlement are analysed. Further, the urban pattern of the other coastal city of Old Madras, which falls in the Coromandel coast region is comparatively analysed.

Literature Study

Fort St. George was the first fortified settlement that happened in Chennai in 1640 by the English. The settlement happened in such a way that White people were allotted lands inside the fort and the Indians were allotted the land adjacent to the fort which is called as Black Town. The settlements happened in a high land yet Chennai has a terrain slope varying from 1:5000 to 1:10000. It is a low-lying area and almost like a pancake. It rises slightly as the distance from the sea shore increases but the average elevation of the city is not more than 22' above mean sea level (Lavanya, 2012).

The settlement patterns were in such a way that the long narrow streets were parallel to the coast line as we see the same pattern which was followed in Pulicat as well as in Pondicherry which are few significant cities among the Coromandel coast. It shows us that these layouts have significance for the human settlement along the Coromandel coast. Later on due to rapid urbanization and unplanned expansion of the city, this typology of layout has been overruled by the real estate developers. Seasonal water bodies were not conserved and later some were naturally closed due to the silt accumulation after heavy rainfall. The partially closed water bodies were then later occupied by the real estate developers who closed the entire water bodies and started construction over it, leaving no ways of water to get stored for the city to survive (Lavanya, 2012).

Chennai frequently experiences flooding due to heavy rain associated with depressions and cyclones, of which few catastrophic floods during 1976, 1985, 1996, 1998, 2005, 2008 and 2010 caused heavy damages. Chennai is facing water shortage which is due to mismanagement of water storage. Chennai is affected by the lack of natural drain due to encroachments of water bodies. Figure 3 shows how Vyasarpadi has been planned on Vyasarpadi Tank and its catchment area due to which the area got severely affected by Chennai

flood in 2015.

Therefore, Chennai is a best example to show how a naturally resilient urban form which once used to take away all the flood into its water bodies has now become non-resilient due to improper management and encroachments of water bodies as well as natural drainage like Buckingham canal which often get silted during heavy rains.

Pazhaverkadu (a) Pulicat

Pulicat also known as Pazhaverkadu (old jungle of Babul trees) (Chandra Roy, 1923) is in Tiruvallur district in the state of Tamil Nadu in India. It is about 60 kilometres north of the state's capital, Chennai. Pulicat was a major port city during the Chola kingdom in the 10th century which is evident from Chola period's Sameshwara temple in Pulicat and Thirupalaivanam temple 6 km from Pulicat (Veludharan, 2016). Later Pulicat came under the rule of Vijayanagar's kingdom from 14th to 17th century. During this period, it was called by different names like Anandarayanpattinam after the governor of the Vijayanagara empire in the 15th century. Later, it was called '*Pazhaverkadu*' during the rule of the great Krishnadevaraya (Azariah, 2006).

The Arabs were deported in ships from Arabia in the 7th and 8th centuries first settled in Kayal and thereafter travelled northwards through Nagore, Tanjore, Mylapore to Pulicat. They migrated during the Chola reign and were traders and merchant experts in boat builders. Their presence led to the use of Arwi known as "Arabic Tamil" by the Arabic speaking Muslims in the Coromandel coast. (m/s Anameka, 2010)

Portuguese established mercantile trade in Pulicat in the 16th century with the help of Vijayanagara emperors (Stephan, 2014). The Dutch first reached Machilipatnam of the Coromandel coast in 1605 A.D. They established trade contacts with the local Muslim rulers as they found the trade to be more profitable by exchange of gold and silver for the cotton textile produced in this area which was later used in Moluccas (Azariah, 2006).

The Dutch landed in Pulicat in 1609 A.D. and to consolidate their position in the Coromandel coast they decided to fortify their factory in Pulicat. They established the headquarters of the Dutch government in 1616 A.D. From then on, all the official decisions regarding the region was taken from Pulicat (DIJK & O, 2001).

Topography of Pazhaverkadu

Pazhaverkadu is at the mouth where the Kosathalaiyar River meets the south end of the Pulicat Lagoon. Coastal lagoons form in areas of low tidal ranges and are created as a shallow basin near the shore. Gradually the shore erodes and the ocean seeps in between the sand bars (Raj, 2001)(Figure#4)

According to the topography of Pulicat, the settlements are planned in such a way that the residential and the commercial areas are located on the high land so that the water drains away naturally during cyclones and rainfall (Figure#5).

Environmental Aspects of Pulicat Lagoon

The lagoon is the second largest brackish water ecosystem in India after Chilika lake in Orissa (Tamil Nadu Forest Department, 2007). Siltation or

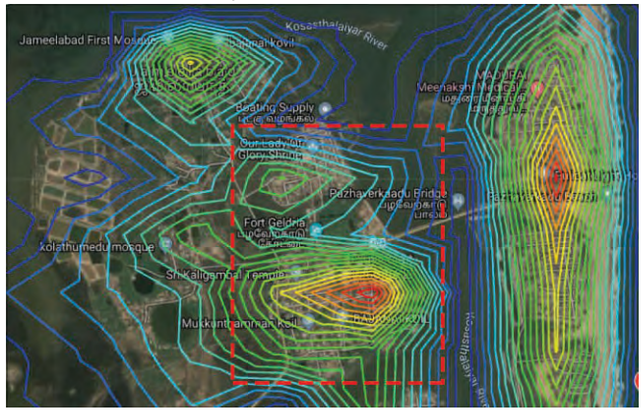

Figure 4:Topography of Pulicat, Source: (Contour Creator, n.d.)

sedimentation is the major ecological problem which has led to the degradation of the Pulicat lake, its biodiversity, fisheries and livelihood of its fisher folk. Siltation or sedimentation is the major ecological problem which had led to the degradation of the Pulicat

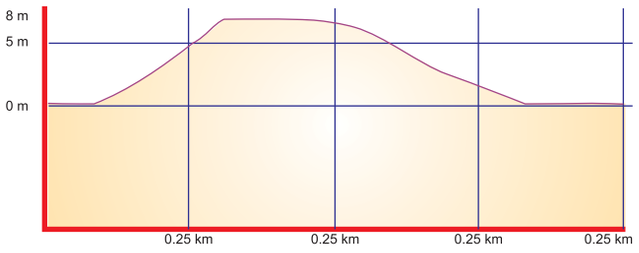

Figure 5:Elevation profile cut along Kottai Street and the Old Fort Region, Source: (Elevation Profile)

lake, its biodiversity, fisheries and livelihood of its fisher folk (Sanjeeva Raj, 2010)

Mangroves are unique tropical brackish water vegetation. Pulicat has witnessed about 80% reduction of mangrove vegetation (Vaithianathan Kannan, 2020). During the site visit to Pazhaverkadu, it was observed that the lagoon edge was covered with

thorny shrubs and that there were no visual traces of Mangrove existence.

Mangroves protect the shore lines from damaging storms, cyclones waves and floods which the Pulicat region is very much prone to. They also help in preventing erosion by stabilizing sediments with their tangled root systems, thereby maintaining water quality and filtering pollutants originating from land (Raj, 2010).

In the native language, Tamil, mangroves are called "*Kadal aathi"* which translates to wave suppressor or the one that calms the sea at the edge of a water body. Today, Pazhaverkadu is mainly prone to soil erosion, leading to siltation of the lagoon which in turn leads to depletion and loss of biodiversity in this region. The mouth of the lagoon is also observed to be closing gradually, leading to lack of navigation possibilities, blocking the intrusion of the saline water from the sea which in turn affects the lagoon biodiversity on which the local fisher folks are dependent for their livelihood.

As suggested in the book by Dr. Sanjeev Raj, partial strip dredging during the summer periods when the water levels are low and the migratory birds vacating the region will help in maintaining the benthic biodiversity which is the primary food source for the higher levels of biodiversity (Raj, 2010).

The Dutch City of Pulicat

Pulicat was the Headquarters of the Coromandel coast during the Dutch period in the 17th century. The city of Pulicat has maintained its pattern from the Dutch period which is observed from the old maps and present-day Pulicat (Figure#6 & 7).

Pulicat consists of two islands, the southern island is the larger island with the fort region, where there is only the remains of the moat .

The northern island was earlier called *De Coopehang*, which is now called *Kottai Kuppam* or the *Christian Kuppam* (M/s Anameka, 2010).There are two churches in the northern island, one built by the Portuguese – Our Lady of Glory Church which was recently demolished and rebuilt. It lies on the central spine of the northern island (Figure#8).
Most of the people here are dependent on fishing for their livelihood and the frontage of their houses are used for drying their fishing nets and baskets. These people follow Christianity. The built forms in this area are more recent than the buildings in the southern

Figure 6: Map of Pulicat in 1690—1705 AD, Source: (Benidict, 2010)

Figure 7: Map showing the north and south island in Pulicat, Source: (Koonu & Gopi, 2019)

island of Pulicat.

The southern island is where the Dutch lived unlike the northern island where the Portuguese were predominant during the 16th century. Today, there are remains of the moat, and the fort region is covered by

Figure 8: View of a street in the northern island, Source: (Koonu & Gopi, 2019)

thorny shrubs (Figure#9).
The northern region was where the old Dutch settlements existed. The Dutch merchants resided in this region on the street which is now called the Kottai street. Even today, the Old Dutch buildings such as the Old Dutch Tax Collection Office stand strong.

From the existing remains of the old Dutch buildings and structural elements , we can assume that the cargo ships halted at the east end of the island, paid their taxes and then goods were allowed into the region.

Figure 9: View of the old fort region and the moat, Source: (Koonu & Gopi, 2019)

The Kottai Street is the most important street in Pulicat which runs east-west cutting the fort region from the settlements as seen in the figure below. The other important streets were perpendicular to the Kottai Street and ran parallel to the sea coast (Figure#10).

It is observed that the residential streets were parallel to the sea coast and the commercial and bazaar streets were parallel to the Kottai Street. These streets were perpendicular to each other.

The southern island is mostly occupied by the Muslims and the Hindus. They are spatially distributed in such a way that they are around the respective places of belief. The old buildings are being demolished and reconstructed without maintaining the architectural character. These newer buildings go up to 4 floors in height and are made of concrete, steel and glass. Though development is inevitable, it is unclear if this kind of development will be resilient to disasters like floods, cyclones and heavy rainfall.

The town today has minimal infrastructure facilities such as sewage which are being disposed of in the septic. With such high buildings in this region and lack of infrastructure facilities, the improper disposal methods and the tendency to discharge into the water body, which is the lagoon, will result in pollution in the near future.

Analysis of the Urban Form of Pulicat

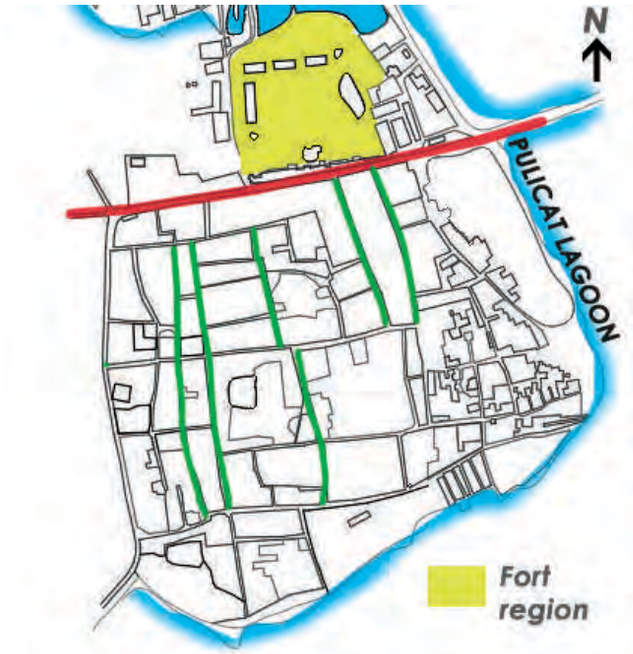

Figure 10: Kottai Street (Red) and other residential streets (Green) in Pulicat Town, Source: (Koonu & Gopi, 2019)

The present-day Pulicat town has adapted itself to the old Dutch urban and built form. The Kottai Street is the main access even today for sale of goods produced in this region mainly fish, seasonal fruits such as mangoes, palmyra fruit, etc. Temporary structures made of thatch and asbestos are along the Kottai Street on the platform, where vendors sell their daily produce.

This street is functional throughout the year and one of the reasons being, it is not highly damaged by any of the natural calamities. From the topography map in Fig 4 and 5 and by talking to the vendors who do their sales on this street, it is evident that this region is at a higher point than the rest of the town and slopes towards the water body. Since the street runs east-west, the water does not slope into the residential or the fort region rather into the lagoon preventing flooding or stagnation in this region(Figure#11).

The image below is of the old Dutch Street in Pazhaverkadu town and more than 70% of the built form here is at least 2 centuries old. The plinth level is between 6” and 1'0”. The built form reveals that there has not been flooding in Pulicat. Usually in regions of high rainfall and flooding, the plinth of the buildings are at least a few feet high to prevent water from entering their houses (figures 12, & 13).

The street pattern in the Pulicat region shows the longer and wider streets run north-south and the narrow streets run east-west. The northern island is elongated north-south and surrounded by the lagoon

on three sides. The street pattern in the Pulicat village shows that major water intrusion will not take place due to its parallel layout of streets which stops the major stroke in the first 2 layers.

Conclusion

There are certain inherent characteristics of the urban form of coastal urban cities in South India that have made it resilient to disasters that the coast is prone to. Today, most of the major cities in the states of Tamil Nadu and Andra Pradesh are port cities. With rapid industrialization, these cities are becoming more prone to disaster; one example illustrated is Chennai and other cities such as Pondicherry, Nagapatinam, etc. are constantly being affected by cyclones, floods and tsunamis. The case of the Dutch city of Pulicat in Thiruvallur district in Tamilnadu sets an example of a resilient city. The complementing factor to this is the presence of the Pulicat lake, which takes the surges from the disasters. Recent activities, such as fishing, port development and expansion of the space station have led to the depletion of the lake area and threaten the flora and fauna of the region. One evidence being the depletion of the mangroves on the coastal areas in Pazhaverkadu, which mainly helps in taking the shocks from floods, prevents sea erosion and plays a major role in the coastal ecosystem. Most of the cities today have developed haphazardly without considering the impact of depletion of water bodies and filling of water bodies. Pazhaverkadu has been resilient all these years, because of the presence and conservation of the Pulicat lagoon which is naturally designed to take the shocks. The lakes and the water bodies in Chennai, which is about 60 km from Pazhaverkadu, are filled with complexes, apartments etc., being built over without any consideration. Thus, it is important that the spatial development in a city should happen in accordance with the natural features, topography, climate etc. ■

Figure 12: View of the streets in the southern island of Pulicat, Source: (Koonu & Gopi, 2019)

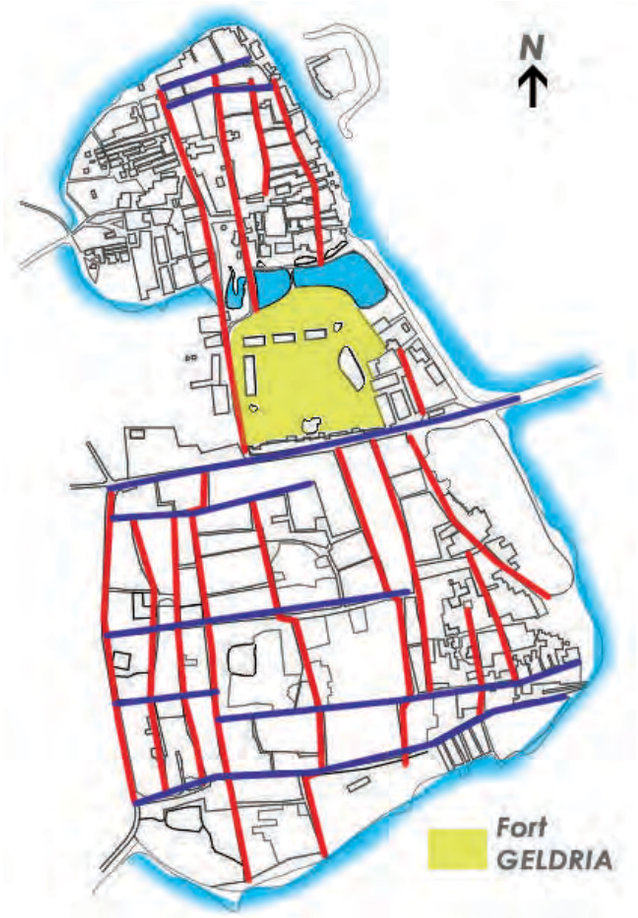

Figure 13: Street patterns of Pulicat Town, Source: (Koonu & Gopi, 2019)

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***This paper was prepared during the internship at AARDE Foundation, Pulicat Lagoon.**

HOW TO MAKE CITIES GREAT PLACES TO LIVE

- Ar Jit Kumar Gupta

An emeritus academician with an experience of over five decades in architecture, Ar Jit Kumar Gupta has also taught at foreign universities in USA, China, Nepal and Bhutan.

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INTRODUCTION

Cities are known to have great potential for promoting quality living, productive working and offering best options for state of art infrastructures, employment, leisure and travel. Globally communities, states, nations, professionals, planners, managers and para-statal agencies are looking at the innovative options to make cities great place to live and work. Unfortunately, all cities do not offer quality infrastructures, amenities and facilities to all its residents. Accordingly, cities do not become inclusive which generally makes them chaotic and inhospitable places to live and work. In the emerging scenario, in addition to being places of excellence, innovations, creativity and doing great business, cities have also become places which are known for their exclusion, dualities and contradictions.-

They are known to have both strengths and weaknesses. If they are known to be promoter of large employment, they are also known to be storehouse of poverty. If they have state of art buildings, they are also home to the most derelict typologies of buildings in the shape of slums. If they showcase wealth, poverty is known to rub shoulders with prosperity. Despite efforts made to make them inclusive, cities believe and promote exclusion. Despite attempts made for promoting planned development, unplanned and haphazard development have emerged as the preferred mode of development. These dualities and contradictions offer great challenge and opportunities to planners and administrators to look at cities, for evolving appropriate strategies to overcome their problems and build on their strength to make them great places for human habitation.

World is urbanizing at a fast pace. Accordingly, 21st century has been called the century of urbanization. However, urbanization does not have uniform spread. With developed world already getting saturated, most

Figure#1: The towering Hong Kong skyline as seen from Victoria Peak

Image Courtesy: Animish B Thaker

of the nations getting impacted by urbanization are the developing nations, where still large population lives in rural settlements. With globalization and economic liberalization, developed nations are looking at the unexploited resources and cheap labour available in the developing nations. Considering large concentration of population in developing nations, providing for a great market for consumer goods, large number of obsolete manufacturing and economic processes are being relocated in the developing nations. These nations are now fast urbanizing in the face of relocated industry and economic activities.

Global Good Practices

Most of the studies made globally have revealed that by the year 2030, 60 percent of the world's population will live in cities. Accordingly, economic growth, social and physical development of communities and nations will largely depend upon how they make their cities more productive, livable, effective and efficient. That could mean, great things for economic growth—if the cities handle their expansion wisely and rationally. What will make a city great place to live and work is the greatest challenge facing nations, administrators and professional planners, becaus5 billion people—60 percent of the world's population—will be making cities as their preferred place of residence by 2030, compared to existing 3.6 billion.

Accordingly, developing nations will have to evolve rational policies, realistic programs and focused strategies to cope with rapid urbanization on an unprecedented scale. Developed nations, on their part, have also to play active role in rationalizing the urbanization process due to rapid immigration, melting of cities, aging infrastructures and stretched budgets. To attract investment, generate resources and make their cities global destinations, all nations are trying to secure/maintain their competitiveness of their cities by providing better livelihoods to the urban people, creating options/opportunities for ease of doing business besides making cities more inclusive, resource- efficient, livable and sustainable. This paper makes an attempt to showcase various options which can help various stakeholders involved in city planning, development and management, to make cities a great destination for all. Few strategies and options suggested /followed /enunciated globally by research institutions/experts/researchers/ academicians/ practitioners/renowned urban planners etc. to make cities great places to live and work, are detailed below:

Ø Smart Visioning

For making any city vibrant, productive, sustainable and a great place for human habitation, it will be critical and pre-requisite to define a smart, realistic and achievable vision for the city. Visioning of the city would essentially involve, lay-down well defined objectives, specifying achievable goals and putting in place detailed agenda for the city to be achieved during its journey to glory. Vision for the city has to be defined based on carrying out detailed study and in-depth analysis besides quantifying problems and identifying potential of the city duly supported by carrying out a SWOT analysis. Realistic visioning shall invariably involve local stakeholders, local communities, local resources, local manpower, local NGOs/CBOs, local intelligence and local institutions of excellence. In addition, vision has to be supported by well-defined mission.

Figure#2: View of Sydney's down town and Darling harbour

Ø Promoting State of Art Planned Development

Planned development has been recognized as the best option for making cities great places. No city can be made great and livable unless it is supported by state of art planning and development on continued basis. Unplanned, sub-standard and haphazard development has been found to be the major root-cause for making majority of the cities in-hospitable and unattractive places to live. Planned development has been found to offer major advantages to the city and its residents in terms of creating appropriate quantity and quality of spaces for living, working, mobility and doing business; provisioning/meeting the basic needs of all the residents of the city; providing basic and essential amenities/services, infrastructures based on the defined norms and standards; creating appropriate services/travel networks; creating public spaces of appropriate quality etc. However, rational siting of the city defined by natural features etc will be critical for ensuring its success and making value addition to city and its environment

Figure#3: Manhattan skyline

and ecology. Quality of manpower, expertise, knowledge, understanding, commitment dedication and sincerity of the teams and systems identified for planning, development and management shall be vital for the success of the city. Acquiring land in bulk for the city planning and development will be pre-requisite and critical for rational planning, making provision of basic amenities and earmarking dedicated space for housing, trade & commerce, institutions, industry, open spaces etc besides generating financial resources for funding the city. Creating supportive, simple, effective and efficient legal framework for city planning, development and management will help in achieving the objective of making city great place to live and work.

Ø Planning Cities in the Regional Context

No city exists in isolation in space. It invariably has a regional context. Great cities support and share with its surrounding rural/ small settlements and are also supported by them in its basic and essential day to day needs. All urban settlements planned and developed in isolation have suffered from the disadvantages of uncontrolled urbanization, duplication/overlapping of services; over/under provisioning of services and infrastructures; malaise of conflicts and dichotomy between city and its periphery. All successful cities have made optimum use of settlements/ space existing in cities and their periphery. Accordingly, for making cities great, they have to be viewed, planned and developed in the regional context. periphery and peri-urban areas. This has not only made city development both rational and cost-effective but have also eliminated all overlaps and conflicts between city and periphery.

Ø Making Cities Compact

Shape, size, structure and typology evolved and followed for the planning and development of the city has been found to have great role and impact on the success, failure and determining quality of life city provides to its residents. Compact city as a typology has been found to have considerable advantages as compared to conventional, ever-expanding and ever-melting cities. Such cities have been found to be most land efficient, energy efficient, cost-effective, eco-friendly and people friendly human settlements. Compact cities are the outcome of planning inside and not outside; planning vertical and not horizontal; planning mix and not pure; planning flatted not plotted development; planning for people not vehicles; planning for accessibility and not mobility etc. Planning compact has the advantage of making city land efficient and energy efficient. In addition, it makes city development and maintenance cost-effective and economical due to limited size, extent and volume of service network. It makes city more

Figure#4: Philadelphia's green lung is the Schuylkill river with trails for biking, walking and jogging along both its banks.

Figure#5: The southernmost part of Manhattan consists of the central borough for business, culture, and government offices of New York city.

sustainable and livable by eliminating pollution, noise and hazards caused by vehicular traffic. It redefines the order of mobility by giving first priority to pedestrianisation and cycling with least priority going to individual vehicles. Reducing area under roads & parking with urban planning based on using land on the principle of 24x7x365 basis helps in economizing and saving of precious urban land, create opportunities for providing more areas under green and quality public spaces. It helps in reducing the carbon footprints and global warming caused by vehicular movement in the city. Compact cities eliminates the heat island effect by the provision of more open spaces, green plantation, landscaping etc reducing the energy requirements involved in the heating and cooling the built spaces. Compact cities promote community living by marginalizing the individual living and offer the best option for planning cities for the countries which are highly land stressed and over populated like India. Compact city concept offers enormous opportunities for making cities zero car, zero waste and zero carbon besides making cities more livable, sustainable and resilient as ordained by Sustainable Development Goal 11, enunciated by UNO.

Ø Making Cities Green

For making cities to be great places to live, work and providers of higher order of quality of life, they shall have to be made and developed essentially as Green Cities in addition to be planned cities and compact cities. Green cities are known for their quality and capacity to make value addition to human living and resources. They are also known to be highly energy and resource efficient besides least consumers of energy and generators of waste. The operational mechanism of these cities does not revolve around or based on using and consuming conventional resources. They are essentially planned, developed and operated, making use of

Figure#7: Central Park in New York is the most visited urban park in USA.

available natural/ non-conventional sources of energy. Their planning is based on the principle of planning with nature and making optimum use of natural resources, flora and fauna available at the local/regional levels. They are known for their capacity to make value addition to the human habitation. They make optimum use of nature and natural resources represented by ***Panchbhutas***, comprising of Prithvi, Jal, Vaayu, Agni and Aakash.

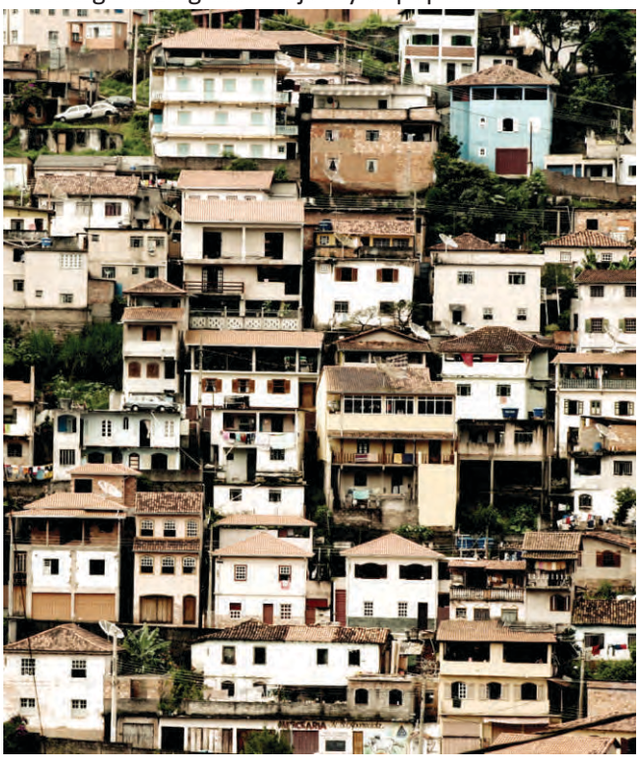
City planning is based on making natural triad of Sun, Space and Verdure (Greenery) integral part of city planning and development process. Built environment created in the green city follows the mandate of optimizing the site/ city/regional climate; best available orientation; existing flora and fauna; movement of sun and air besides creating optimum indoor air quality; reducing waste and using minimum energy and water. In search for optimum solutions to make cities and buildings green, Indian Green Building Council has already evolved framework for zero energy buildings; whereas evolving framework for zero water building is on the fast track. Ultimately Green cities will be planned and designed as zero energy, zero water, zero waste, and zero pollution settlements with technological advancement

Figure#6: Pastel coloured houses dotted along the Piazetta with a cobbled square overlooking the harbour in Portofino, Italy

graduating to make them resource/energy/water positive cities.

Ø Making Cities Inclusive

Despite making great contribution to economy, employment and infrastructure, cities are also known to be places showcasing dichotomy and contradictions on large scale. Intensity of contradictions goes on increasing with increase in size and growth of the city and population. With rising cost of land and living, large cities believe in marginalizing vast majority of population which do not have enough resources.

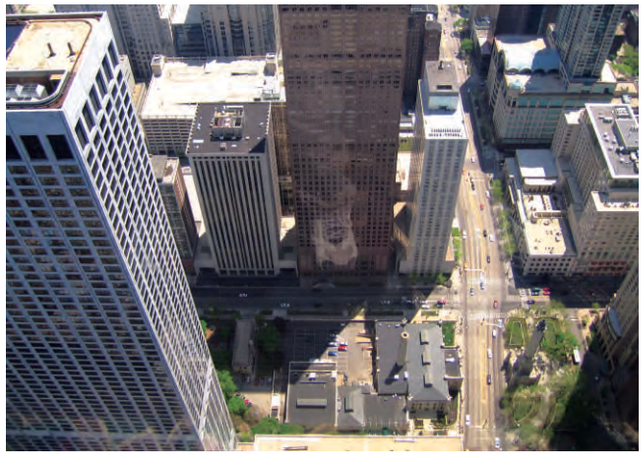


Figure#8: Rocinha, the largest slum (Favela) in Sao Paulo, Brazil consists of low-middle income neighbourhood and exhibits governmental neglect.

Cities believe in welcoming elites and people with resources. Cities remain largely stratified, duly showcased by areas having good infrastructures and bad infrastructure; good housing and bad housing; planned and unplanned development; excess and lack of open spaces/amenities etc. Accordingly, rapid growth and mushrooming of slums, dilapidated housing, inadequate basic infrastructures, poor quality of life, informal housing; growth of informal trade and commerce; lack of open spaces, poor amenities and services etc are some of visible signs of exclusions displayed by majority of cities. Cities must be developed to provide appropriate options of gainful employment to all its residents to enable them have decent wages/adequate resources to meet their day to day needs. Cities should offer their citizens inclusive opportunities with a sense of personal pride, belonging and ownership for the place. Cities should make provision for adequate space, duly marked and developed, to enable all its residents, a place for living and doing business. No city can be great place to live unless it is made inclusive and self-sufficient, catering to basic needs of the all its citizens, irrespective of their economic& social status, gender, sex, age, caste, creed, place of residence etc. Accordingly, great cities have to be inclusive by creating an inbuilt system which would provide basic amenities of life even to the poorest of the poor of its citizens, to lead a dignified life.

Ø Making Cities Safe

Safety remains a distinct feature and characteristics of great cities**.** For making cities great place to live, they have to be made safe against social / physical / economic discrimination; crimes; manmade and natural disasters. Safety has been found to have great connectivity and positive co-relationship with livability and prosperity.



Figure#9: Hundreds upon hundreds of streets vector through the windy city of Chicago with each street having its own unique etymology.

All great cities are known to be promoters, providers and assurers of safety and security to its inhabitants. Majority of declining cities globally have been found to suffer from the malaise of being unsafe. For promoting safety, cities have to evolve innovative people/area centric options. For safety against crime, all public spaces would require careful round the clock monitoring and surveillance. Using technologies and installing cameras at all public spaces shall be essential for eliminating any chance of crime at these places.

Figure#11: Eastwick in southwest Philadelphia, a poor neighbourhood. The crime rate here is 60% higher than the national average of USA.

Planning has a great role in promoting safety in cities. All introvert planning is known to be promoter of lack of safety in cities. Visibility would be crucial for promoting safety in city and making the public places safe.

Avoiding dark and inaccessible corners will be crucial to promote safety in the cities. Safety has to be made integral part of urban planning / development and preparation of master plans / development plans of cities in order to make cities great places to live and work. For making cities safe against natural disasters, all low lying areas, floodable areas; derelict areas; areas under forest/ water bodies; eco-sensitive areas etc. have to be earmarked as areas prohibited for urbanization. Infact carrying out a detailed land suitability analysis for any area/city for determining the suitability of area for urban development and its use in the urban context will be crucial to promote safety against any natural and manmade disaster.

Figure#12: The Bean, sculpted by Ar Ashish Kapoor at Millenium park, Chicago, draws millions of visitors annually.

Figure#13: River cruise in downtown Chicago is a popular tourist destination to explore chicago's towering skyline and famed river front.

Ø Leveraging Heritage, Art and Architecture

Great cities are known to have always leveraged its available heritage, both natural and manmade, to make value addition to the city in terms of its growth and development by attracting visitors from home and outside. Heritage has also been used to promote economy and generate resources for the city besides generating gainful employment for the local communities. These cities have made numerous efforts to identify its valuable heritage, evolved policies and programs to preserve, conserve and promote heritage; made heritage integral part of city planning, development and management process; involved communities in identifying heritage and its management by evolving people centric policies to create local ownership. In addition to optimizing heritage, great cities have also made optimum use of art and architecture to make cities iconic. Many great cities are known for their great work of art and architecture. Globally, great cities are known for their great public spaces, with great pieces of art and architecture. Renowned artists/master craftsmen/professionals can be actively involved, on continued basis, in making derelict areas/public places as the most attractive spaces in the public domain by their creativity and works of art. Many cities have also become great by the existence of iconic buildings created by the master architects. Accordingly, profession of architecture and eminent local architects can also be actively involved to make cities a great destination.

Ø Creating Quality Public Places

Iconic public plazas, green spaces, boulevards, streets, squares, people, food, outdoor environment, transit systems, in-creditable art ,

architecture, museums, galleries and parks, which belong to and create ownership for people and community at the local level, are known for their capacity, role and importance to make a city great. *Minneapolis, Madrid and London*, are the leading examples of creating amazing spaces in the public realm (Alex Garvin**).** However, for public spaces to become qualitative, iconic, amazing and great, they must be made *universally accessible*- identifiable, safe and easy to use, accommodating people of different goals, backgrounds and creating reasons to be there. Such spaces should also be made *universal providers***-** offering something for all who visitor them- shops selling crafts and art, restaurant, entertainment, leisure etc. *Have capacity to attract and maintain demand***-** by drawing people from near and far; eliminating noise, pollution and cars; providing retail opportunities; cutting off the street from vehicular traffic; making space an open-air people mall etc. *Defining a framework for urbanization*, to promote development-- by aligning public spaces to lead to the city's iconic buildings/ conspicuous landmarks. *Making spaces People centric*, *Sustainable, eco-friendly***---**by involving communities, designing them for people based on basic human needs-- fresh air, lack of noise/trash, plenty of shade, unifying environmental remediation and economic development to promote economy and environment. *Nurturing a civil society*--for bringing out the best in people; involving people/ business/ communities/ para-statal agencies who use them; making them responsible for overseeing them-- New York's Grand Central Terminal.

Ø Promoting Quality Leadership

Based on interviews carried out of the Mayors and city leaders besides analyzing the case studies of globally successful cities, ***McKinsey*** concluded that core processes and services from urban planning to financial planning and social housing besides benchmarks, that can transform cities into superior places to live and work, were largely the outcome of the great efforts made by leaders in improving their cities. No city can be made great unless it has great leadership which is knowledgeable, committed, and sincere, focused and believes in performing and delivery. Leadership has to be essentially local, representing the local communities, duly elected by local communities directly, based on the pre-defined vision and detailed agenda for action for the growth and development of the city. They should be able to involve communities in the decision making and make optimum use of available resources. Leadership has to be accountable and answerable to the local communities for its action, performance and decisions. Leadership should have adequate time to perform and deliver besides having freedom to raise resources and invest in the city development programs. Freedom from outside and state interference has to be guaranteed, based on appropriate checks and balances. Good leadership must be duly recognized and awarded for their qualities, performances and innovations. As per study made, ***McKinsey*** concluded that great leaders have to do three things really well to make cities great places, which inter-alia should include:

- ø **Achieving smart urban growth** through identifying and nurturing the very best opportunities for growth; planning ways to cope with its demands; integrating environmental thinking, and ensuring *all* citizens enjoy a city's prosperity. Good city leaders also think about regional growth because with metropolis expanding, they will need the cooperation of surrounding municipalities and regional service providers; integrating the environment into economic decision making; investing in city infrastructure to reduce emissions, waste production, and water use, as well as building high-density communities.

- ø **Doing more with less** Great cities secure all revenues due; explore investment partnerships, use technology; make organizational changes that eliminate overlapping roles and manage expenses and leveraging, rationally designing and executing private–public partnerships, as an essential element of smart growth, delivering lower-cost, higher-quality infrastructure and services.

- ø **Winning support for change** Considering the fact that change is no easy, and its momentum can even attract opposition; successful city leaders build a high-performing team of civil servants; create a working environment where all employees are accountable for their actions; take every opportunity to forge a stakeholder consensus with the local population and business community; taking steps to recruit and retain top talent; emphasize collaboration, and train civil servants in

the use of technology. Mayors are only too aware that their tenure being limited; no longer-term plans are to be articulate for gaining popular support. Short-term projects, more critical for successes, which can start a virtuous cycle that sustains and encourages a great urban environment.

Ø Using Smart Technologies

Technology has a great role in making a city more productive, effective and efficient in terms of delivery/managing of services; maintaining the quality of services; rationalizing traffic and transportation; promoting mass transportation; promoting urban planning; creating base maps for the city; preparing and monitoring implementation of master plans/ development plans; urban governance; involving communities in planning, development, management and governance; creating a data base for managing the city; granting permissions for building plans; networking of urban services; promoting transparency in decision making; managing disasters; monitoring operations; recording/resolving public complaints; determining operational status of infrastructures; controlling crimes; making cities safe; promoting energy efficiency; managing resources; monitoring waste etc. Globally all successful cities are evolving and devolving new systems for making optimum use of technology for managing their day to day operations besides looking for future options for making cities more livable and productive. Cities are being networked so that technology can be leveraged for promoting ease of doing businesses, creating employment and promoting economy of the city. However, use of technology still remains limited which has impacted the city planning, development and management. Making cities great places to live will gravitate around our capacity to leverage the technology in the domain of urban planning, development and governance.

Ø Leveraging Landscaping

Most livable cities globally, are known for their achievements in the field of planning, designing and promoting quality landscaping, creating network of open spaces/parks, green belts, gardens, boulevards, city forests etc. These spaces not only make cities most livable but also promote quality of life. These spaces are known to make value addition to the city, communities, real estate and its residents in terms of promoting health; creating aesthetic value; creating interface between manmade and natural environment etc. Green spaces are known to promote physical activities and overcoming stresses and strains of daily life. Studies made globally have revealed, people living near green spaces are three times more physically active than those living away from them. The incidence of falling sick has been recorded lower in areas having large open spaces. Cities having large number of trees and open spaces are known for their health related advantages. Many cities globally are known for their landscaping and open spaces which attract large number of visitors, both from within and outside the city. Curitiba city has emerged as one of the most successful urban experiment due to creation of large open spaces and state of art landscaping in the city. Chandigarh also has emerged as one of the best livable city because of its unique landscaping. City planning in case of Chandigarh was supplemented with its landscape planning right in the beginning. Landscape planning has to be based on the local climate and climatic conditions; quality of soil; local flora & fauna; pattern of planning; pattern of land use; segregation of non-compatible land uses; making optimum use of derelict/low lying areas; creating a network of green spaces; creating area for shading pedestrians; connecting man with nature; connecting nature with traffic and transportation; pattern and hierarchy of roads; promoting walkability; overcoming adverse orientation in designing ; locating and making value addition to the built environment etc. Promoting and planning landscaping would also require protecting, preserving and promoting the existing wealth of the flora and fauna in the city by creating an enabling legal framework besides creating a data base of the wealth, so as to monitor its status over a period of time.

Ø Creating Vibrant Communities

Remains one of the major challenge and focus of successful cities. Vibrant city life flourishes only in neighborhoods that serve multiple functions having mix of compatible land uses to support mix of tenants and attract different people throughout the day and night; having small blocks with narrow streets interlaced with piazzas/open spaces for people to walk, meet, interact and chat. Vibrant communities offer great support to promote social

living and making cities safe. For communities to become vibrant, they have to be planned as self-contained and self-sustaining entities, providing all the basic human day to day needs based on walkability. The size of the community is based on human scale and contents are defined so as to promote cohesion and diversity. These communities have mobility based on pedestrianisation with focus on safety for children and elders. All public places occupy central positions whereas all activities attracting mechanized vehicles are put on the periphery. These communities have dedicated open space available within the walkable distance and have well defined boundaries.

Ø Creating a Dedicated Local Agency

For making any city great place and creating a local ownership, it must have a dedicated agency responsible for planning, development and management for the city. Multiplicity of agencies existing at local level, with over-lapping areas of operation and responsibilities have done more damage than good to make cities great places. Indian cities lack ownership, which has emerged as the major cause for their irrational, haphazard and unplanned development besides steady decay and decline of the Indian cities. City Planning remains divorced from development and management leading to emergence of dualities and contradictions in city growth. Despite enactment of 74th Constitutional Amendment Act, 1992, mandating urban local bodies to be made institutions of urban governance at the local level, urban local bodies have not been recognized as the agencies for planning, development and management of urban areas at local level. These agencies remain under the perpetual shadow/mercy of the development authorities created at the local/state level in the area of planning and development. Lack of adequate financial and manpower resources have made urban local level agencies highly vulnerable, functionally ineffective and operationally inefficient, incapable of leading the cities to become great places. Accordingly, for making any city great place, it must have a fully empowered and dedicated agency having adequate capacity, capability, manpower/financial resources, structure, leadership, processes, functions, responsibility and authority to take care of its planning, development and management issues. For creating an fully empowered and dedicated local level agency, it will be critical to have a comprehensive, well defined, simple, easy to understand, operate and implement, legal framework for planning, development, management and governance of urban areas.

Guy Parson considers five things that make a city great place which include; *they're exciting*-energizing, inspiring places to live; *they're tasty*-- providing with known quality of food, bars and restaurants. *They're worth exploring*--having interesting places to live and explore. *They take things a little easier*--City putting in less hours at the office and having more spare time for socializing; *they're friendly*- where people would like to chat to a stranger.

Jeffrey Sachs suggests that large natural resources do not necessarily lead to making cities great. He finds negative correlation between resource abundance and economic growth/urban innovations/employment, because resources not only fuel conflict but also create monopolies. Natural resources can also deter growth by lowering levels of education. Diversity would be critical to make a city great. Blessed by its harbor, New York became a great place, which gave it diversity involving worldwide connections leading to the growth of the garment industry, printing, publishing and financial services.

Way Forward

From narrative given above, it can be visualized that making cities great places to live and work, remains both complex, difficult and daunting task, requiring out of box thinking, adopting multiple` approaches and innovating state of art options for planning , development and management of cities. Rapid pace and massive influx of population in the urban areas offers enormous opportunities and challenges to innovate, experiment, evolve and devolve to the planners, architects, engineers, professionals, developers, administrators, politicians, urban local bodies, para-statal agencies, private sector and other stakeholders to make cities great entities and best place for living and working; meeting all basic human needs; promoting ease of doing business; promoting sharing; creating enabling environment and spaces for all human operations. How effectively and efficiently we meet these challenges and make use of opportunities offered in the urban domain, shall hold the key to the sustainability, growth and development of the communities and nations. All cities can be made places to live and work, depending upon how residents, local communities and all stakeholders commit, involve, innovate and experiment to achieve the objective of making their city great place.

UBIQUITOUS CHICAGO EDIFICES ABOVE THE CLOUD COVER

- Animish B Thaker

A Graduate in Science and Printing Technologist (1983) from Bombay University, the author is also the founder of Krishna Graphics, a Mumbai based Print & Design Studio. His photo features on the social fabric of Mumbai ave been carried by Times of India group of publications as well as Anand Bazaar Patrika. Besides having lectured at Sir JJ & JIPT, Mumbai, he has also been on the jury and panel discussions at annual NASA conventions. His long association with the Indian Institute of Architects and his annual visits to USA to be with his daughter has inspired him to write this travelogue on Chicago.

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As my flight Air India AI-126 began its descend on an early july morning in to Chicago's O'Hare airport, the iconic Sears Tower, now re-christened as Willis Tower (Fig.#1)came into view with its glass façade shimmering with sunlight. When completed in 1973, it was the world's tallest building with over 16000 glass windows until 2014, when One World Trade Centre was officially opened to the public! Well this is Chicago, city of Skyscrapers. For an avid student of architecture like me, how I wished the flight would delay its descent to maximise the views.

Hemmed in by lake Michigan and the scenic Chicago river from three sides, Chicago has grown vertically with every noted architect having a signature building in this city. Although architectural marvels spawn across its urban realm, there are four core areas that one must segregate into to plan one's exploration of this sacred Megapolis. Thankfully, I was lucky to be prepped on a walking tour by a qualified guide from the Chicago Architectural Foundation to plan my daily sojourns into downtown Chicago.

Firstly, there is the Michigan Avenue area which showcases exciting new buildings, second comes the Loop, which is the back bone of all international commerce and trade, third and the most popular is Chicago's famed River-front and last but the most emphatic is the distinct Campus architecture of University of Chicago, Illinois Institute of Technology and Rush University. Also, one simply cannot afford to miss out on display much acclaimed public art like the Cloud Gate, Sir Anish Kapoor's iconic sculpture, also known as the Bean (Fig.6 & 7), is a must visit spot, with the city's skyline getting reflected on its shiny and reflective surface.

Not far from Yoshi Yamda's Superkhana International, known for serving Indian cuisines, especially Mumbai's Vada Pav, is the Picasso Sculpture near the Daley Center, a neighbourhood having modernist buildings and city courts. Yoko Ono's Skylanding, a symbol of peace located in Jackson Park, Public art on display at Millennium Park and Navy Pier's 20 M tall Centennial Ferris Wheel add colour and shape to Chicago's skyline offering a 360^{0} view of the city and Lake Michigan.

Frank Gehry's Jay Pritzker Music Pavilion (Fig.#2) in Millenium park is the genius architect's first foray into Chicago. Clad in stainless steel panels, the pavillion frames the stage opening and connects to an overhead trellis of curved steel pipes. Hovering above the lawn, the purpose of the trellis is to distribute quaity acoustics to a packed audience of over 5000.

The Great Chicago Fire of 1871 killed 300 people, destroyed about 3.3 square miles (9 km^2), and left

Figure 1: Willis Tower formerly known as Sears Tower designed by Skidmore, Owing and Merrill in 1973

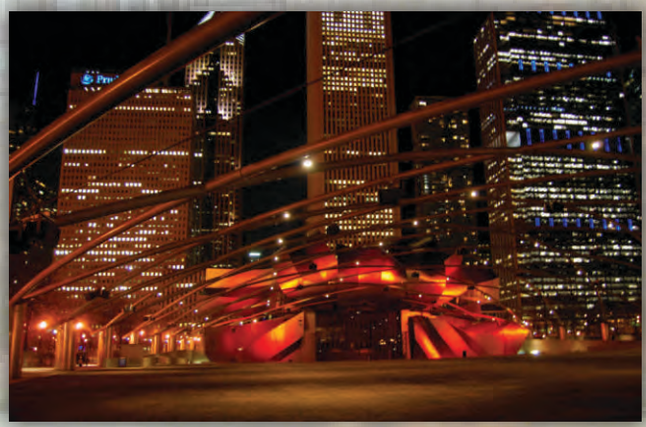


Figure 2: Jay Pritzker Pavilion is a highly sculptural design element intended to act as a focal point for the Millennium Park.

Figure 3: Organized in a series of layers, Poetry Foundation is a petite 2400 SQM creation designed by John Ronan Architects is located on the corner of Dearborn and Superior street. Like a poem that invites multiple readings, the space encourages repeated visits, revealing itself slowly over time.

more than 100,000 residents homeless. However, by that time Chicago had become the world's fastest-growing city and its population had risen over 300,000 inhabitants. The fire meant these ambitious citizens had to start again. Many famous architects landed and with admirable strength, the city was reborn from the ashes and some of Chicagos best architectural edifices were constructed immediately after on the blank slate to reinvent it and create its futuristic buildings. Structures like the Rookery Building (1888, Frank Lloyd Wright), the Auditorium Building (1889, Louis Sullivan) and the Monadnock Building (1893, Burnham & Root, Holabird & Roche) are a few examples of the high standards the city was aiming for.

So many high-rise commercial buildings being built in Chicago gave birth to the Chicago School of Architecture. In the late nineteenth century, high rises were made possible by invention of elevators and linked by construction similarities, including the use of metal structural frame (exo-skeleton) to support the building. Bay, Oriel or Chicago windows were specially created to take in maximum light along with the use of the latest wind-bracing and foundation technologies.

The City of Chicago's first comprehensive planning document was also prepared during this period by Daniel Burham and Edward Bennett which included the development of efficient transportation systems, grand boulevards, monuments, civic improvements and waterfront beautification projects.

Since then, Chicago has only continued adding value to its urban grid with new buildings and public art spaces have been progressively enhancing the city's beautiful skyline as well as aesthetic appeal respectively. This year Chicago celebrates the 2019-2020 Biennial and the city has plenty to offer. But, where to start?

Here are a few incredible landmarks that has attracted me to Chicago's built environment, some old, with

Figure 4: At the time of its completion in 1968, John Hancock Center became the world's second-tallest structure. This tower was so relevant for the design firm of Skidmore, Owing and Merrill (SOM) because it meant the beginning of a skyscraper career. After then, they went on to design Sears Tower in 1973, tallest in the world for over twenty years followed by the Burj khalifa in 2010, currently the world's tallest building.

Figure 5: The limestone exterior walls of Tribune Tower are now covered with 150 historically significant items from other buildings, structures and landmarks. These remnants include artifacts from all 50 states of USA, the Great Wall of China, the Taj Mahal and other famous structures throughout the world.

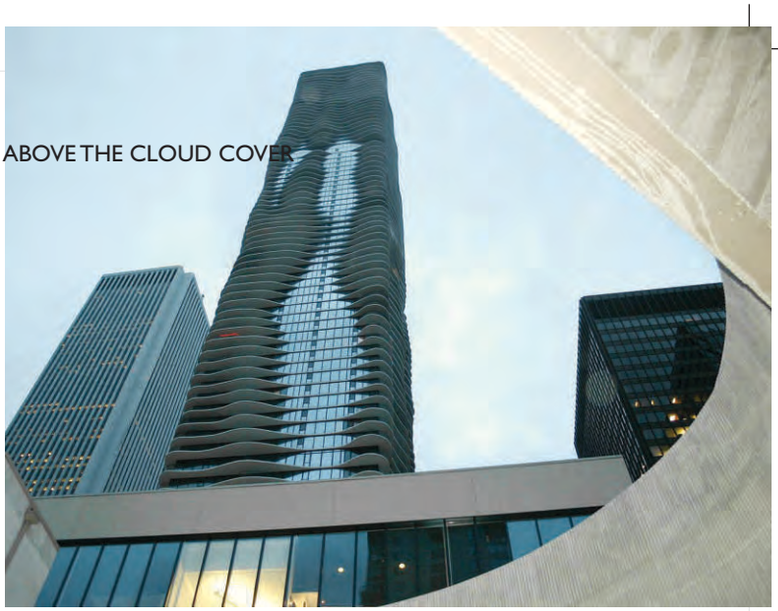


Figure 8: Taking inspiration from striated limestone outcropping – a common feature in the Great Lakes region – the façade of Aqua Tower undulates in and out. Floor slabs across the height tower vary according to use, views and sunlight creating an undulating and sculptural elevation.

surrealistic charm, that have stood the test of time and many new, which will continue to attract for eons.

The Michigan Avenue area is a favoured location for exciting new buildings. With Aqua Tower (Fig.#8) and Chicago Media Production Centre as well as the striking multi-faceted glass façade of Spertus Institute for Jewish Learning, a ten storey 13,475 M^2 structure faced with an unusual folded glass surface. This façade adds modernist distinction to Michigan Avenue's historic context. A scissor staircase adds drama to the airy three storey atrium. This famous avenue also has the blue and green glass tower of Roosevelt University.

A few blocks away from Michigan Avenue is the small, subtle Poetry Foundation headquarters (Fig.#3). Who would have thought that a butterfly would serve as the model for a new hospital or that one of the most remarkable new buildings would be built not for a residential condominium or a corporate, but for the pleasure of poetry?

The skyline of Chicago, like all major cities in United States of America, is constantly changing, yet the Loop remains the downtown's commercial core. Reliance Building and Willis Tower (formerly Sears Tower), the second tallest building in America are the principal structures to admire here. Credit for the evolution of the steel-frame skyscrapers lies herein. Words like acroteria, antefix, bifora, cartouche, covato, flying buttress, mullion, ogee, soffit, and spandrel besides many other such gems come alive offering a visual treat as I tread through the Loop. The green conscience of Chicago is also clearly visible as numerous green roofs and rooftop gardens on flattop skyscrapers help reduce heat gain and provide insulation.

Popular among art and architecture aficionados as well as the tourists gouging on the very popular deep dish pizzas made by Lou Malnatti and Pizano, is the unique boat cruise through the Chicago river which allows oneself the pleasure of watching some of the greatest edifices laced with innovative architectural features and quirky aspects while nursing a glass of craft beer made by local brewer, Revolution Brewing and without having to walk around downtown with a crick in one's neck.

Figures# 6&7: Cloud Gate, popularly known as "The Bean", is the centre piece of AT&T Plaza at Millenium park, Chicago, draws millions of visitors annually. It is the creation of India born British artist Sir Anish Kapoor.

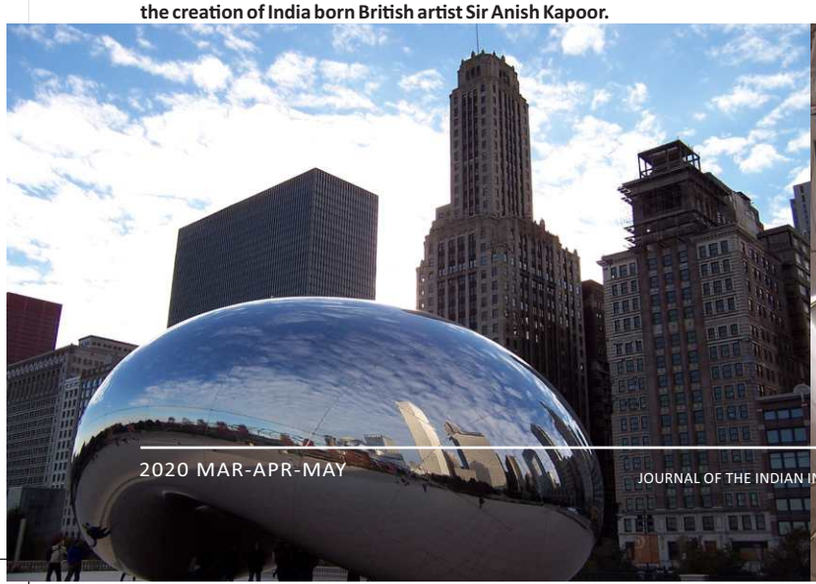
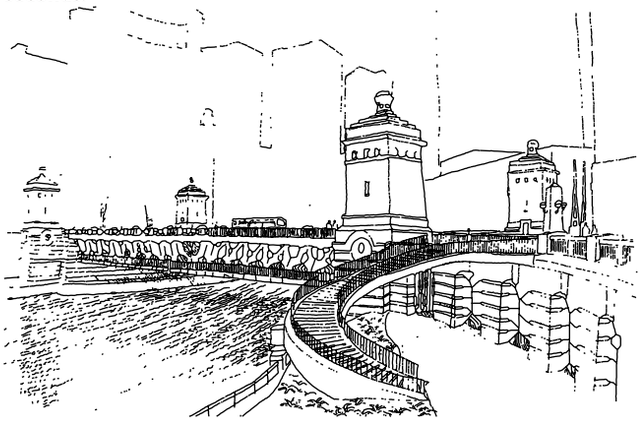


Figure 9: Designed by Bertrand Goldberg way back in 1964, Marina Tower, with its iconic corn cob towers, and identical floor plans, became the first circular apartment buildings in history. It was designed as a self-contained town, full of residential and commercial units – a revolutionary concept at that time. Goldberg then went on to continue designing many iconic building residential towers like the Old Prentice Women's Hospital and Stony Brook University Hospital in Chicago.

Figure 10: Chicago engineers perfected a bridge type in which leaves divide, rotate around a trunnion pin, and return to their fixed positions. The Michigan Avenue Bridge is the world's first double-leaf, double-deck trunnion bascule bridge, capable of handling twol levels of traffic and still clearing the channel in 60 seconds.



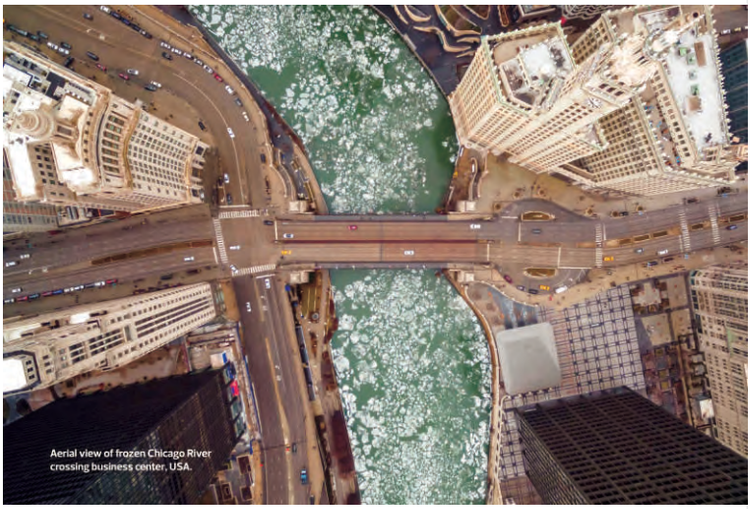


Figure 11: Aerial view of frozen Chicago river crossing the Business Center. Drone Image Courtesy: Er. Charles Martinez - US Army Civil Engineer

In 1900, Chicago successfully completed a highly innovative engineering project – reversing the flow of the Chicago river backward from Lake Michigan so that it emptied into the Mississippi river. The river now thus splits into north and south branches to form exceptional view corridors for buildings that line its banks through the downtown. Once the home of factories and warehouses, the Riverfront now includes some of the most renowned Business houses and mixed-use structures in the city. The river cruise glides under thirty odd moveable bridges, many of them Bascule bridges, which act like giant seesaws for bigger ships to pass.

As we pass the Wrigley building, the guide explains that the building built in 1921 with glazed terra cotta, was the first in Chicago to have a centralised air-

Figure 12: Scenic river-front view from the boat during the river cruise.

Figure 10: Designed by Alfred Shaw the structure conveys an unique, modern concept of the MART with an Art Deco style and integration of elements from three building types: the warehouse, the department store and the skyscraper office building. The building opens up at pedestrian level where the two-story base is glazed with the display windows typical of a department store.

conditioning system. This 41-storey speculative edifice rends the fabric of Chicago with scale, siting, materials, and proportion. Instead of stone, brick or terra cotta, its façade is horizontal aluminium banding. With its roofline sliced into two triangular towers, the view is simply spectacular at night when the white lights outline the diamond shaped roof-line against the dark sky.

Next to follow is the Tribune Tower (Fig.#5) housing the famous Chicago Tribune newspaper office. Designed in 1922 by Raymond Hood and John Mead Howells from New York in a design competition, it has a flying buttress inspired by France's Gothic cathedrals and a façade embedded with 120 rocks and stones from all over the world – extracted from Parthenon, Notre Dame, Berlin wall, the Great Wall of China and Tajmahal to name a few.

Offering a great counterpoint, 82 storey, 1,77,500 M^2 mixed-use Aqua tower (Fig.#8) catches my attention.

Figure11: The Joe and Rika Mansueto Library designed in 2011 by Architect Helmut Jahn is a must visit destination in Chicago.

Figure 12:Trump International Hotel and Tower is a condo-hotel in downtown Chicago right on the banks of the Chicago river. Designed by architect Adrian Smith of Skidmore, Owings and Merrill. this 98-story structure, reaches a height of 1,388 feet (423.2 m) including its spire, its roof topping out at 1,171 feet (357 m).

An elegant and surreal example of mix-use, the building has a five Star hotel, condominiums and apartments with undulating balconies. Designed by Architect Jeanne Gang (Studio Gang Architects) in 2010, it is the first ever skyscraper commission given to a woman architect here in USA.

Next to appear out of the fast wading skyline is Marina City (Fig.#9), designed by noted American architect

Figure 13: Robie House, a masterpiece of the Prairie style and a forerunner of modernism in architecture, Frank Lloyd Wright broke down old barriers, creating a residential design with a horizontal roofline, large overhanging eaves, continuous ribbons of windows, and a wide-open living space at its center.

Bertrand Goldberg. The first ever building to have a "city within a city" with gyms, retail stores, restaurants, an ice rink and the bottom 19 floors devoted to spiral parking ramps. As the river turns sharply, a building with a curving façade looms alongside blending into the views. Designed by Kohn Pederson Fox associates, 333 Wacker Drive is sheathed in greenish-blue glass reflecting the river, sky and the structures around it.

Developer and current US President Donald Trump makes his Chicago debut with the tall, slinky Trump International Hotel and Tower (Fig.#12), located on one of the more prominent sites in the city. To its south is Hyde Park Art Center. Designed by architect Doug Garofalo, the intervention is a study in how to redesign a drab industrial structure into a creative zone for community activities.

Towards the end of the river cruise, I espy upon an Art Deco landmark, the Merchandise Mart (Fig.#10), a mammoth building with over 3,70,000 M^2 of built up space making it the world's largest building when constructed in 1930. Owned by the Kennedy family, it was a wholesale market. Made of 29 million bricks, 40 miles of plumbing and over 4000 window frames. Behold, it even had its own zip code!

The last three decades have seen universities in Chicago commission some of the biggest projects giving fillip to campus architecture. The hospital tower at the Rush University & Medical Center designed by architect Ralph Johnson in 2012 merges state-of-the-art hospital facilities with sustainable features in an unusual form, a butterfly's silhouette. The 14 storey 78,000 SQM building is added to Rush Medical College founded in 1837. The slanted and cylindrical three storied terrarium adding natural light and green elements to the lobby is simply spectacular.

The Illinois Institute of Technology where Ludwig Mies van der Rohe once worked, showcases a campus center by Rem Koolhaas while the University of Chicago continues to select leading architects from across the world to implement its expansive campus plan. The latest commission being the Barrack Obama Library. The Joe and Rika Mansueto Library (Fig.#11) is one of the many stunning buildings around University of Chicago.

The library tries to solve a storage space problem: 3.5 million books needed an Automated Storage and Retrieval System. The structural grid-shell of 120 x 240 ft. and the insulated glazing represent a very minimal and intelligent system for mediating between the varying exterior conditions and the desired interior comfort.

Not writing a single word on the legendary architect Frank Lloyd Wright, the creator of Prairie style before I end my travelogue would be sheer sacrilege. This gifted architect used his first home to experiment with design concepts that contain the seeds of his architectural philosophy which became the forerunner of modernism in architecture. In a studio adjacent to his house, Wright and his associates developed a new American architecture – the Prairie style.

The successful design of his house and studio led to neighbours commissioning a big number of houses around Oak Park, including the birthplace of Ernest Hemingway. Charnley-Persky House constructed in 1897 by him on Astor street is one of the oldest houses of Chicago and it is said to be the first modern house ever built in Chicago. Frank Lloyd went on to design many landmarks in Chicago like the Charley-Pesky House and then across North America. Even today, his creations are well preserved around Chicago and keenly studied by both students of architecture and art lovers. The Robie House (Fig.#13) now owned by the University of Chicago, is currently looked after by the Frank Lloyd Wright Preservation Trust, which is restoring the house as a museum.

Very tall buildings enter into a realm that many cultures consider as sacrosanct. In metropolis Chicago, that feeling of reverence is all pervasive.

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APOLOGIA:

My humble apologies to legends Alfred Caldwell, Bruce Graham, Dwight Perkins, D H Burnham, Er. Fazlur Rahman Khan, I M Pei, Louis Skidmore, Nathaniel Owings, Rem Koolhaas, Stanley Tigerman, and Reva & David Logan Centre for the Arts, University of Illinois at Chicago's Gerald Ratner Athletics Centre and Illinois Institute of Technology's McCormick Tribune Campus Center, and so many other illustrious creators and their hidden gems seen across Chicago which I could not include here for want of space. – Author

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