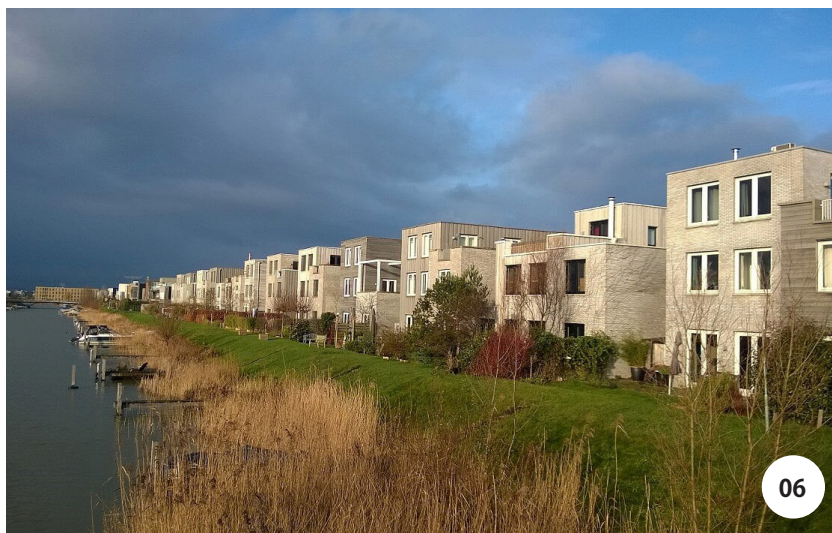


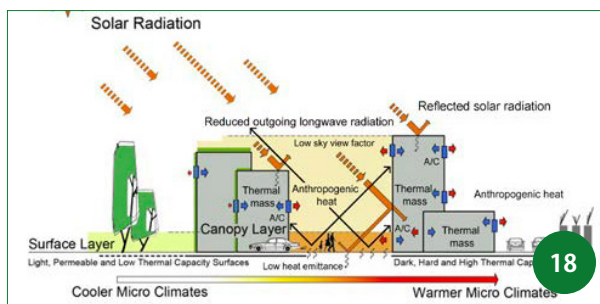
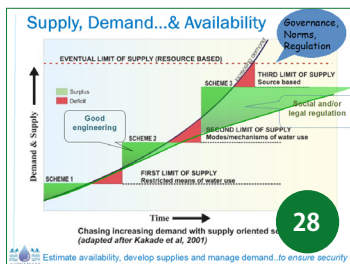
# CIDCO @SMART Newsletter

JANUARY- JUNE 2019 | VOLUME 5 ISSUE 1 & 2

SPECIAL EDITION  
URBAN ECO SYSTEM



06



## CONTENTS

SMART CITY ACTION PLAN .....	2
▪ <b>Project in Focus</b>	
Air and Noise Quality Monitoring Network	
Extrusion Based Mechanical Biological	
Treatment for MSW	
FEATURED COURSES ON UJJWAL .....	4
UJJWAL@SMART CITY LAB .....	4
▪ <b>Interviews and Feedback</b>	
Interviews of Training Attendees	
NEWS UPDATES.....	5
INTRODUCTION .....	6
DATA SHEET .....	8
Indicators for Slum Redevelopment	
Program – Guidelines for a comprehensive	
and sustainable action	

## SMART CITY CORNER

▪ <b>Emerging Ideas</b> .....	14
Self-Organisation in Amsterdam:	
Case-Study of Oostenburg	
Urban Heat Island Effect Causes	
and Remedies	
▪ <b>Innovation</b> .....	20
Towards Better Air Quality: Case study of	
London's LEZ	
Urban Food Systems: Case Study of Baltimore	
Food Policy Initiative	
▪ <b>Best Practices</b> .....	24
Impact of Urban Morphology on Social Life:	
Case-Study of La Duchère, Lyon	
Urban Sanitation and Waste Water challenge	
of India: Imperative of Water Demand	
Management & Non-Sewered Sanitation	
Systems	
Providing Accessibility to Low-Income	
Neighbourhoods: Case Study of Metrocable	
in San Agustin, Venezuela	

BIBLIOGRAPHY.....	28
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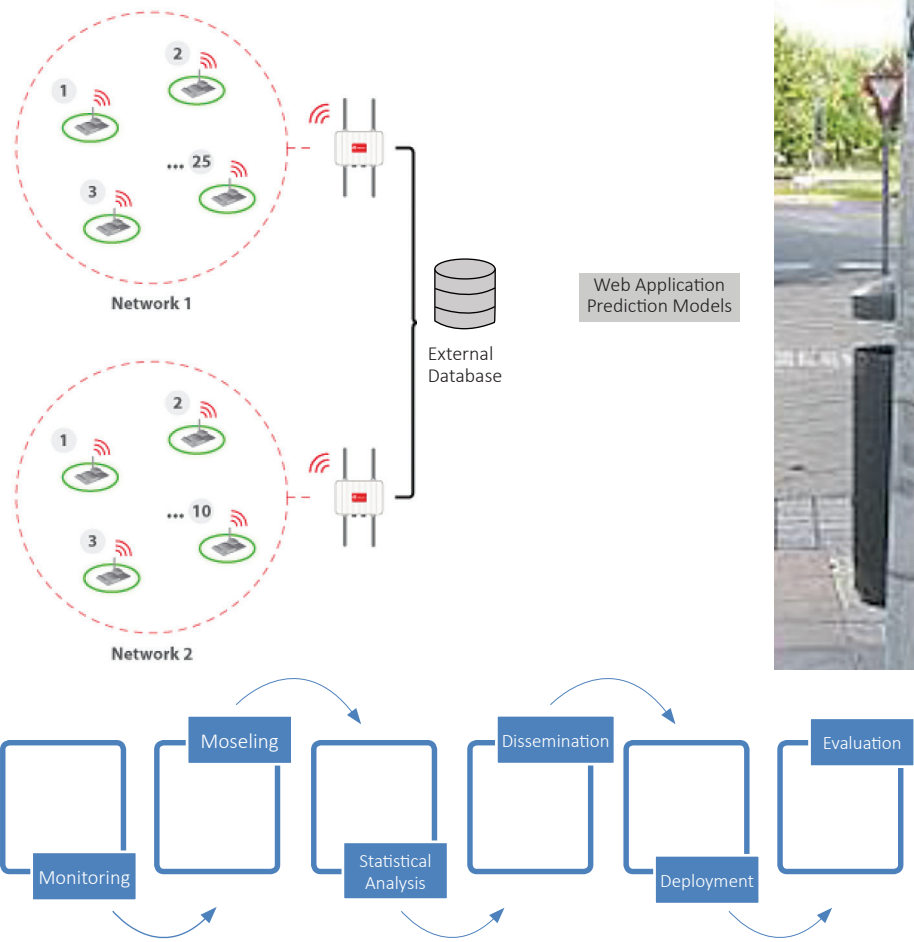
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### PROJECT COORDINATOR

- Ravindrakumar Mankar, ACP, Navi Mumbai



# Air and Noise Quality Monitoring Network



### Background

Clean air is considered to be a basic requirement to human health and well-being. However, air pollution continues to pose a significant threat to health worldwide and is a critical environmental issue that cannot be ignored. According to a WHO assessment about the burden of disease due to air pollution, more than two million premature deaths each year can be attributed to the effects of air pollution. More than half of this disease burden is from the populations of developing countries (WHO, 2005).

The increasing trend of the global urbanisation results in high levels of air pollutants in urban areas and megacities, decreasing air quality. Transportation, road traffic, home heating, industrial emissions, and other local anthropic actions are the major emission sources of air pollutants to the atmosphere.

Air pollution control and air quality monitoring is needed to implement abatement strategies and stimulate environmental awareness among citizens. For this purpose, CIDCO is proposing a pan city air quality monitoring network.

### Location

Pan City- Selected Locations

### Scale

City Level and can be scaled up to Regional level

### Cost

Rs. 2 Crores per year

### Date of Commencement

January 2016

### Date of Completion

December 2016

### Detailed Scope

Air-quality Sensors Network for an Environmental Friendly Urban Traffic Management- main goal would be to achieve sustainable management of the traffic in the CIDCO Navi Mumbai (South) by using two key-elements: a pervasive air-quality sensors network as well as prediction models. Sensors Networks to be deployed in different locations, measuring a range of parameters such as:

- Temperature
- Relative humidity
- Carbon monoxide (CO)
- Nitrogen Dioxide (NO2)
- Ozone (O3)
- Noise
- Particle



Source: Libellium Telecommunications Service Provider  
Smart City Project in Salamanca

### Progress

- Yet to initiate the preliminary study to identify the locations for installation

### Benefits

Air quality monitoring is often used to determine the air pollution levels in urban environments.

- A monitoring network produces concentration measurements that can then be compared with the national and international guideline values.
- The prevalence of risk factors can be used to estimate population health risk from exposure data.

One of the most important functions of the monitoring is to provide basic information for estimating:

- The level and distribution of exposure in the population;
- The population groups with high exposure; and
- The risks of potential health effects.

On-line air quality monitoring can be used in warning and alert systems during episodic pollution events. These systems use mass media to inform people of the current air quality and, if necessary, to give instructions aimed at reducing excess pollution and minimizing exposure. Monitoring ambient air quality also provides important input data for epidemiological studies, which are crucial in establishing associations between health outcomes and concentrations of ambient air pollution. In general, exposure assessment requires both monitoring and modelling to identify target sources for reducing emissions and to implement an effective programme of air quality management for protecting human health

# Extrusion Based Mechanical Biological Treatment for MSW

### Background

At present CIDCO region in Navi Mumbai generates about 300 Tonnes per day (TPD) of solid waste, which is treated and disposed at a 35 acre Chal village site in Taloja. Currently the site is able to handle the present waste disposal requirement with “aerobic windrow composting” method. The site faces resistance from local communities due to odour, leachate generation, ground water contamination and spontaneous fires. With increasing garbage, more waste gets littered on the streets and starts choking storm water drains preventing water draining during the monsoon season. This leads to water accumulation and rise in a plethora of serious respiratory and health disorders like malaria, dengue etc. Further land is a very limited and precious resource and the current method of using scientific landfills not only leads to rampant utilization of the land resource but also threaten the aesthetic appeal of any area. This facility was initially designed to handle 55 TPD of municipal waste, however with consistent increase in population and quantum of waste generated, at present the plant is handling 300 TPD of MSW. The existing facility has a 50 m x 100 m long composting platform, where the incoming waste is stored in forms of windrow for a period of 30 days, after processing the MSW, the retained materials sent to the land fill area. Approximately 6 hectares of land, comprising 5 cells have been allocated for scientific landfill. Out of these, 2 cells have been used and closed and 3 cells are balance. As the waste quantum has increased considerably in the last 3-4 years, the balance 3 cells are expected to get exhausted in the next 2 years time. CIDCO does not have an alternative site to cater to municipal waste after that. Hence, it was decided to carry out processing and disposal of solid waste by adopting new MBT technology at the site vetted by IIT Mumbai and Roorkee.

### Location

Chal near Taloja MIDC

### Scale

City

### Cost

Rs. 176 Crores

### Detailed scope

With the view to tackle the garbage menace CIDCO has envisioned a “High Priority Garbage Disposal Plan”, which will not only limit the ever-increasing land use pattern but also provide a modern garbage treatment and disposal methodology to the country. Currently most of the ULBs undertake public private partnership (PPP) contracts with various agencies for collection / transport and disposal of MSW based on a tipping fee model. Tipping fee charges vary from “no charge” to 1500 Rs/ton based on different regions, distance of transport and level of treatment. In some cases, agencies are also required to pay a “royalty fee” or a “-ve tipping fee” to the Corporation. However none of the cases

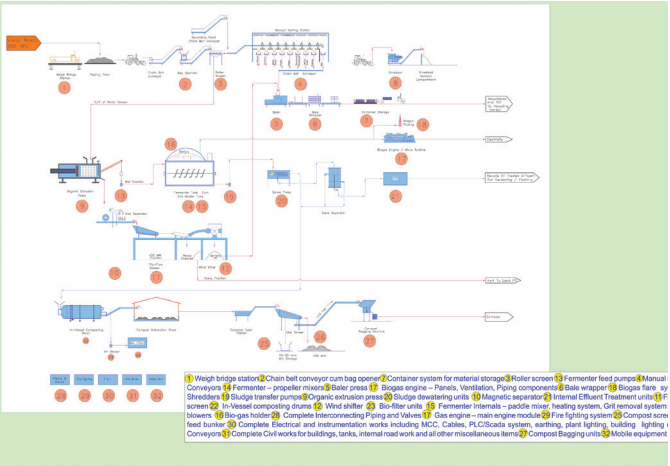
have been proved as a successful model for garbage disposal, which can be replicated. Garbage disposal continues to be a problem, with inability to meet the MSW 2000 rules and draft 2013 guidelines in spirit.

In order to avoid such a situation in future, CIDCO has decided to develop an MSW treatment facility, for the CIDCO region, which solves all the environmental issues and also meets the MSW 2000 guidelines in letter and spirit. CIDCO will have permanent ownership on the facility. A separate operation and maintenance contract will be given for a shorter duration of 3 to 5 years wherein the operator is given a fee to operate and maintain the plant. The plant shall have an automatic, SCADA based control system. It will be completely enclosed, odour free, neat and clean.

The plant is to be installed initially to handle 300 TPD MSW and subsequently augmentable to 600 TPD of waste. The MBT scheme of waste management is as under-

- Primary segregation by Biomethanation and Composting
  - Primary sorting to recover recyclables
  - Waste segregation into wet and dry fraction

- Bio-methanation of organics to generate electricity
- In-vessel composting of the digested sludge
- Segregation of waste
- Extrusion based process
- Extrusion press work



### Progress

Tenders will be invited shortly

### Benefits

The E-MBT process is specifically designed to treat both, inorganic and organic waste. Compared to other technologies E-MBT offers the following-

- Composting process is reduced to 7days from 45 days required in aerobic process system
- Minimise human contact to avoid health hazards, odour and leachate
- No bird, vector nuisance which is important as Airport is planned near to the area
- Disposal of only the inorganic inerts to the landfills area
- E-MBT facility will generate sellable products like compost, electricity, RDF and recyclables as stated under, which gives revenue and reduce operation and maintenance cost
  - Recovery of Recyclables
  - Segregation of organic and inorganic fractions and recovery of RDF
  - Bio-methanation of the organic matter into biogas and generating electricity from the same
  - Generation of Compost using completely enclosed In-Vessel composting drums

The quantum of resources from solid waste treated by E-MBT method is as indicated in table.

S.No	Resource from input waste	% of Input waste	Quantum
1	Recyclables	3 to 5%	18 tons/day
2	Compost	8 to 10%	60 tons/day
3	Electricity	0.5 – 1.2 MW per 100 T of input waste	4.0 MW/day
4	RDF	12-15%	72 tons/day





## FEATURED COURSES ON UJJWAL

Zero Waste Decentralised  
Solid Waste Management  
**17<sup>th</sup>-19<sup>th</sup> July 2019**

Environmental and social  
impact Assessment  
**26<sup>th</sup>-30<sup>th</sup> August 2019**

Land Acquisition- Rehabilitation  
and Resettlement  
**15<sup>th</sup>-19<sup>th</sup> July 2019**

Understanding Self and others  
for organisational growth and  
performance  
**06-07<sup>th</sup> August 2019**

Transformational  
Leadership  
**22<sup>nd</sup>-23<sup>rd</sup> August 2019**

Achieving  
Operational Excellence  
**05<sup>th</sup>-09<sup>th</sup> August 2019**

Modern Survey  
and data Collection  
techniques for highway  
**16<sup>th</sup>-20<sup>th</sup> September 2019**

Inner Development  
for Outer transformation -  
**09<sup>th</sup>-13<sup>th</sup> September 2019**

Management information  
System- Cost and finance  
management perspectives  
**20<sup>th</sup>-21<sup>st</sup> August 2019**

Soil Investigations and  
Ground improvement  
techniques in Infrastructure  
Development  
**4<sup>th</sup>- 6<sup>th</sup> September 2019**

UJJWAL@SMART CITY LAB – INTERVIEWS AND FEEDBACK

# Interviews of Training Attendees

Mr. Vijay Shantaram Rane – Deputy Chief Fire Officer, Fire

**The winning edge: communication strategy for leaders -  
Indian Institute of Management, Ahmedabad**  
24<sup>th</sup> – 29<sup>th</sup> September 2018

**You have recently attended a course on  
Leading with Emotional Intelligence. How was  
your experience?**

The training was very good. They had specified expert faculties for all the topics. One of the faculties asked us to share my experience regarding strategic management. Out of many emergency cases I experience, I got a chance to explain one of the strategy management technique I used in case of an emergency.

**Do you think this course helped you in your  
current role and how do you relate this course  
to your daily life (personal and professional)?**

Despite the fact that the course is not so relevance with our job in the fire department, the way they taught us has turned out to be highly beneficial. The course was on communication strategy for leaders and in my current position the learnings of this course is helping me a lot. This course has helped me in understanding the difference between perception and reality. I believe the skills that I learnt will help me in taking better decisions in the future.

**Who all were the participants and how was  
your interaction with other participants?**

Most of the participants were from different MNCs. The interactions with them led to many healthy discussions. For every task or assignment, we were

divided in groups. The discussions and interactions within the group during the exercises helped us know each other and share our ideas.



**What was the best part of this training? If you  
want to highlight anything in particular?**

The participants were divided in groups of 4-5. After the lecture, the members of the team were instructed to gather in a room and prepare for the next day. The best part of the training was that we were kept busy all the time. It was made very clear that their idea is to make the participants learn and not take the training casually.

**How do you think if other CIDCO employees go  
for similar course would be benefitted?**

I would suggest this course for the top line leaders of all the departments in CIDCO. As far as my department is concerned, my recommendation would be to have more technical courses relevant to our field.

**What are your views about implementation of  
Ujjwal in CIDCO?**

I am highly satisfied with Ujjwal services and I am willing to go for a next training again soon. I would also like to thank our management to provide us such a great opportunity.

Ms. Poonam Amardeep Shinge- Assistant Law Officer, Legal

**Understanding Environmental Laws for Better Compliance - Centre for Science and Environment**  
18<sup>th</sup> – 22<sup>nd</sup> September 2017  
**Communication, Presentation Skills and Report Writing - Indian Institute of Management, Indore**  
14<sup>th</sup> – 16<sup>th</sup> January 2019

**You have recently attended a course on  
Communication, Presentation Skills and Report  
Writing. How was your experience?**

I have done two residential trainings through Ujjwal. My training experience in both the trainings was excellent. The first training was on Understanding Environmental Laws for better Compliance in Centre for Science and Environment. The faculty in this training were very good and made the topic very simple. The second training in IIM, Indore also had excellent faculty.

**Do you think this course helped you in your  
current role and how do you relate this course  
to your daily life (personal and professional)?**

The content taught in my second course on communication and report writing is a part of my current profile and has helped me a lot. In my daily routine, I have to give my opinion on different files. Report writing training has played an important role in improved my writing and communication skills. Apart from these two trainings, I have also attended a customized training on RTI which was also very helpful. The first course I attended hasn't been so

useful in my daily work as of now but it might be useful if I am transferred to some other department.



**Who all were the participants  
and how was your interaction with other  
participants?**

The participants were from different organisations, both public and private. They were from different fields like planning, engineering, scientists, etc. In both the trainings, I got many opportunities to have discussions with the fellow participants.

**How do you think if other CIDCO employees go  
for similar course would be benefitted?**

Of-course, especially the course on communications, presentation skills and report writing is highly relevant for CIDCO Officers and I strongly recommend it.

**What are your views about implementation of  
Ujjwal in CIDCO?**

Ujjwal team is doing a great job in helping CIDCO in its Capacity Building model. It will go a long way.

Mr. Yogesh Thakur – Accountant, Accounts

**Advanced Financial Management - Administrative Staff College of India, Hyderabad**  
11<sup>th</sup> – 13<sup>th</sup> February 2019

**You recently attended a course on Advanced  
Financial Management. How was your  
experience?**

Course was very useful and the content of the course was very good. It helped me in improving my knowledge about financial management. The latest updates on GST in the course were very useful to know the current situation of our country. The overall experience was very good. The food, boarding and lodging facilities were up to the mark and everybody liked it. I think everyone should attend similar kind of trainings.

**Do you think this course helped you in your  
current role and how do you relate this course  
to your daily life (personal and professional)?**

This was a technical course related to my field, it gave me a chance to learn about GST and work towards the financial aspects of the role I have been given in CIDCO. The learnings from this course is surely going to contribute in my daily activities. The case studies discussed during the training were highly relevant to my current role of handling proposal section. For example, one of the case studies was on credit rating of the companies. CIDCO is financing some major projects and we prepare the abstracts. So, the ways to judge and analyse the situation of a market, taught during the training, will definitely help me in my current profile.

**Who were your fellow participants and how  
was your interaction with them?**

Participants came from different institutes and organizations in all over India. All the participants were senior managers working in the finance department of different public sector organisations. It was very fruitful to share my thoughts with them

because but they handle multiple tasks and in CIDCO we have a very typical kind of work. Some of them were from Indian Navy and Indian Railways as well and they were handling projects of big budget.

The participants came with varied experience, for example, some people working on purchases were handling purchases at the national level. I also got to discuss about e-portals that many government organisations are now using.



**What was the best part of this training? If you  
want to highlight anything in particular.**

There were many relevant case studies. I feel that the special lecture on GST and Taxes Law from a person from the GST's core team responsible for forming the GST was excellent and very helpful. We had lot of queries and they managed to resolved almost all of them.

**How do you think if other CIDCO employees go  
for similar course would be benefitted?**

Yes, I definitely recommend this course for all the employees in CIDCO's Accounts Department because this is a very relevant course for our department.

**What are your views about implementation of  
Ujjwal in CIDCO?**

After the introduction of Ujjwal attending a training has become much easier. Earlier we had to go to different Institute's website and scroll hundreds of courses. However, in Ujjwal, one can find all the courses from different institutes under one platform and it is so easy to select them. You just have to select three courses as per your interest and your role in CIDCO. I really want to thank the training portal team for providing us such a wonderful platform.

Ms. Pranali Hemant Kubde- Deputy Planner, Planning

**Sustainable Habitat - National Institute of Technology, Nagpur**  
7<sup>th</sup> – 12<sup>th</sup> January 2019

**You have recently attended a course on  
Sustainable Habitat. How was your experience?**

My experience with the training was very good and informative. The training was very well planned. It was a 5 and a half day programme with many faculties to supervise us. Every day we used to get exercises based on the lectures given during the training. On the last day, we were asked to give an exam. So, I must say that the training programme was very well organised.

**Do you think this course helped you in your  
current role and how do you relate this course  
to your day to day life personally as well as  
professionally?**

I selected this training because I felt it was related to my work profile. During the training programme I was introduced to many concepts related to planning field useful in our daily work in the planning department. Some of the best practices taught can be implemented in our projects for better results. Currently, I am working on city planning for Palghar New Town and I am trying to incorporate few learnings from this training.

**What was the best part of this training? If you  
want to highlight anything in particular?**

One of the faculty from Hyderabad has created a huge pond with the help of his students in the University itself, it helps the university in solving their water problem. Through the years, many endangered

species can be seen around the pond now. Currently, many villagers approach him to learn this technique and solve the water scarcity problem. It was a very good learning for me and one of the best parts of the training.



**Who all were the participants and how was your  
interaction with other participants?**

Most of the participants were lecturers, few of them were planners and architects as well, from both public and private sectors. We used to discuss many city level problems and their probable solutions. It used to be a healthy discussion, different people had different views. These discussions resulted into a lot of knowledge sharing.

**How do you think if other CIDCO employees go  
for similar course would be benefitted?**

Yes, of-course this is a very relevant course and I would suggest it to all planners and engineers working in CIDCO.

**What are your views about implementation of  
Ujjwal in CIDCO?**

The kind of training provided through Ujjwal is really required. It helps us in enhancing knowledge, makes us aware of real situations and keeps us updated. These kinds of trainings also help us in interacting and learn from different organisations. I must say that Ujjwal has given us a platform that was really necessary.



## NEWS UPDATES



The NIUA-CIDCO Smart City Lab coordinated a 5-day executive programme on 'Insights on Urban Management'. Seven participants visited the Lee Kuan Yew School of Public Policy of National University of Singapore (NUS) to learn about multiple topics.  
**Date – 21<sup>st</sup> February 2019**



Female employees of CIDCO attended a 2-day training on Prevention of Sexual Harassment (POSH) in Hyderabad. Many topics related to sexual harassment at workplace were discussed during the workshop.  
**Date – 15<sup>th</sup> April 2019**



CIDCO Smart City Lab's training cell organised a self-defence training for all the female staff members of CIDCO. The aim of the workshop was to sensitize women on crime awareness, safety and self defence. Self-defence expert, Mr. Sharif Bapu, gave lessons and important tips to the participants to act smartly and safely to protect themselves in times of danger.

**Date – 18<sup>th</sup> April 2019**

Siddharth Pandit, Chair, CIDCO Smart City Lab presented CIDCO's training management system and UJJWAL portal to members of AIGGPA (Atal Bihari Vajpayee Institute of Good Governance and Policy Analysis) in NIUA office, New Delhi.

**Date – 18<sup>th</sup> April 2019**

Customised Training on 'Transparency in Governments — The Right to Information' was held in All India Institute of Local Self Governance (AIILSG), Mumbai

**Date – 14<sup>th</sup> June 2019**



# Introduction

Cities are complex systems; their economic, social and infrastructural components are closely inter-linked with each other. They have proven to be engines of creativity, wealth creation and economic growth (Bettancourt & West, 2010). Each city has its own way of pursuing prosperity depending on their stage of socio-economic development, history and culture (UN-Habitat, 2013). Its attributes can only be understood in relation to their prevailing social arrangements, their economic system and the style of inducing spatial agglomeration (Scott, 2012). These systems depend on the interaction between the different actors in a city. It depends a lot on whether the communication is formal or informal; or whether the community is proactive to public participation or not.

Allen Scott (2012) points out that the core of a city resides in the theory that a group of actors' cluster together in a geographic setting. They group to minimise the cost of their mutual interactions happening in the location of their inter-linked activities and take advantages of their jointly determined synergies. These jointly determined synergies, as a consequence of the size, scope and density of any social and economic order, refer to (Scott, 2012):

- Institutional arrangements
- Local markets
- Social interactions
- Capital-intensive infrastructure
- Efficient and cheaper production of goods
- Learning and innovating processes
- Intensifying the know-how

Diversity and multitude of ideas are natural for big cities and therefore, it is important to deal with combinations or mix of uses, rather than keeping

them separate (Jacobs, 1961). The cohesive environment of the synergies, mentioned above, form the basis of an urban ecosystem present in every city. The level of efficiency and the availability of resources define the level of urban prosperity. Inefficient development notions and policies brings forward deprivation, inequality, instability and exclusion in a city. To understand better, UN-habitat (2013) identifies 5 categories of urban prosperity:

- Productivity
- Infrastructure
- Quality of life
- Equity
- Environmental sustainability

Evolving framework of an urban ecosystem views cities as heterogeneous, dynamic landscapes where multiple categories and the synergies (mentioned above) diverge (Grimm et al, 2008). A cohesive environment, where these categories and synergies connect and prosper at multiple scales, form the basis of an urban ecosystem.

## Urban Ecosystems

Each urban system has its individual patterns and characteristics influencing its habitat. It functions as an interdependent system between provision of public goods, work and social life. Any urban ecosystem can be highly interconnected and unpredictable (Macpherson et al, 2016). It has been observed that many significant and fast shifts in the social and physical structure of the cities are taking place. Some of the evident shifts can be seen in restructuring of local markets, renewal of urban landscape, increased demand for housing, climate change, use of technology, etc. With the shift, urban ecosystems design now focus



Cidco@Smart Vol 5, Issue 1&2, 2019



on integrative design, technological innovation and socio-technical transition. For a broader understanding in today's context, we can say that a city should be capable of (UN-Habitat, 2013):

- Stimulating local job creation and promoting social diversity
- Recognising the importance of public spaces
- Providing social, political and economic conditions of prosperity
- Reducing disaster risks and vulnerabilities, especially in the poorer neighbourhoods

- Creating harmony between the dimensions of urban prosperity

It is hard to imagine any complex system being run by a single authority or ideology. Any successful system requires proper functioning of its various elements. Efficiency of these elements is vital for the communities and individuals to flourish, thrive and sustain in a city. The key here is to walk a fine line and find the right mix of activities, to take initiatives and encourage people to participate actively (Batty, 2011). A comprehensive list is

difficult to apprehend, however, there are a few elements that can always be identified for all the cities, some of them are mentioned below (UNDESA, 2012):

- Inclusive and locally rooted vision for cities
- Providing decent urban mobility for all
- Integrated planning of sustainable urban infrastructures
- Energy and water supply security and empowerment
- Sustainable construction processes, buildings and maintenance
- Promoting local skills
- Sharing data and knowledge
- Financing at all levels of the government

This issue of CIDCO@Smart further looks into these different elements in detail through various case-studies around the world. Each of these articles cover one or multiple points mentioned above. The different articles cover topics like:

- Accessibility to lower-income neighbourhoods
- Equitable access to food
- Urban Heat Island effect
- Indicators for a slum redevelopment programme
- Impact of urban morphology on quality of life
- Self-organisation strategies in Amsterdam
- Low emission zones in London
- Urban Sanitation and waste water challenge in India

Cidco@Smart Vol 5, Issue 1&2, 2019

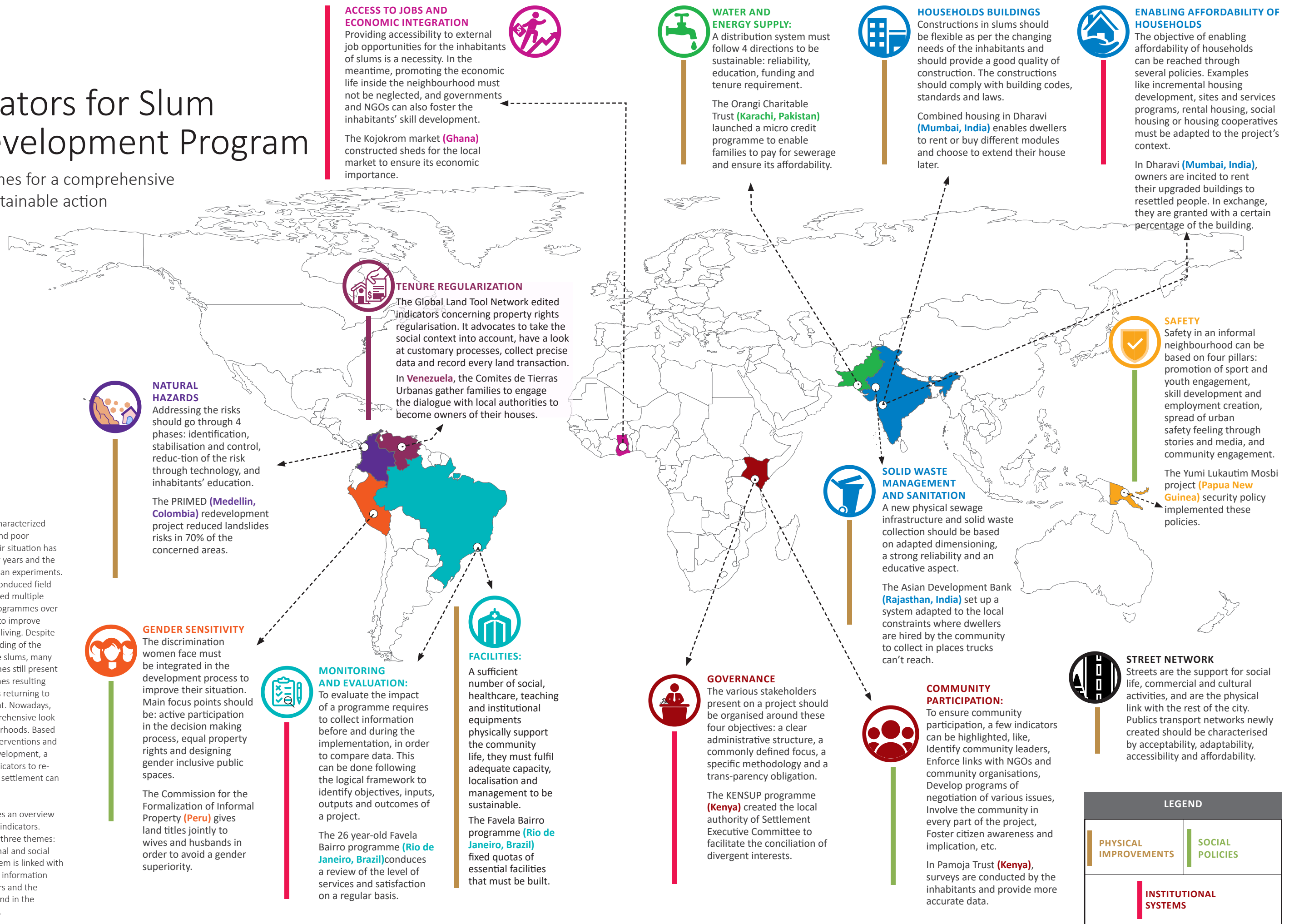


# Indicators for Slum Redevelopment Program

- Guidelines for a comprehensive and sustainable action

Slums are informal neighbourhoods characterized by overcrowding and poor infrastructure. Their situation has been a concern for years and the place for many urban experiments. Concerned cities conducted field studies and launched multiple redevelopment programmes over the years in order to improve their conditions of living. Despite a better understanding of the issues affecting the slums, many of these programmes still present shortfalls, sometimes resulting in slum inhabitants returning to their former habitat. Nowadays, cities have a comprehensive look on these neighbourhoods. Based on the styles of interventions and the patterns of development, a common set of indicators to re-design an informal settlement can be identified.

This datasheet gives an overview of some identified indicators. They are parted in three themes: physical, institutional and social actions. Each of them is linked with a case study. More information about the indicators and the sources can be found in the subsequent article.





# Indicators for a Slum Redevelopment Program

Informal settlements represent a significant part of urban ecosystems. Due to the booming economy, growth rate of cities in developing countries is much higher than the developed countries. Almost 32% of the urban population of the world live in the cities of developing countries (UN-Habitat, 2012). The same number was responsible for 50% of the urban growth globally between 2000 and 2010 (UN-Habitat, 2014). Unprecedented demand, lack of infrastructure and facilities creates marginalised populations and inequalities, leading to development of slums. The United Nations Habitat programme uses five characteristics to define slums (UN-Habitat, n.d.):

- Inadequate access to safe water
- Inadequate access to sanitation and infrastructure
- Poor structural quality of housing
- Overcrowding
- Insecure residential status

The interventions to upgrade conditions of the slums date back to as early as 1969 when The Kampung Improvement Programme was launched by the UN as world's first slum-upgrading pro-gramme (UN-Habitat, 2006). The aim of slum-upgrading programs is to tackle the issues mentioned above through a rather holistic approach. In India, tackling these issues can lead to improvement in the quality of life of at least 6 million households (Hindman, 2015). This article takes a comprehensive look on some of the neighbourhoods and suggests some common indicators that should be considered while designing slum redevelopment programmes. These indicators are broadly divided in three areas:

- physical improvement
- institutional systems
- social policies

These indicators must comply with the context of the concerned upgrading program. Slums are organic neighbourhoods following the ever-changing needs of their inhabitants. Narrow streets, hazardous locations and social frameworks must be considered while building a sustainable community that relies on the existing frameworks. Innovation is the key to create specific solutions for sustainable slum upgrading.

## Physical improvement

Physical improvements visibly improve the quality of life and transforms neighbourhoods. Several programs advocate on the provision of infrastructures before solving the insecurity of tenure and other social concerns (De Soto, 2000). Some of the factors that should also be considered are as follows:

### Steady Water and Energy Supply

Mostly, slums lack a formal water and energy distribution system. The primary focus on providing the infrastructure, in many informal settlements, is often constrained due to the overcrowding and difficulty in accessing the areas (Arias-Granada, Haque, Joseph, & Yanez-Pagans, 2018). However, it should also be noted that presence of a physical infrastructure alone

is not enough. According to World Bank, the implementation of water and energy distribution system should follow the following steps (Arias-Granada et al., 2018):

- Funding
- Tenure requirements
- Education
- Reliability

Many households are not able to afford the implied expenses of a new water supply system. Re-development programs must include grants and subsidies to encourage the inhabitants to use the provided water and electricity supply network and the sanitation systems. For example, the Orangi Charitable Trust in Karachi launched a micro credit programme to enable families to pay for sewerage (UN-HABITAT, 2014). Simultaneously, organising awareness campaigns can highlight the advantages of legal energy access and improve user-behaviour.

Furthermore, developing trust between users and providers spawn reliability. The municipal networks must suffer no interruption, water must be clean and should be devoid of any bacterial contamination. For example, the slums of Dhaka have a water distribution system better than many slums, however, the quality of the water is not equally good, almost 57% of the dwellers still report quality issues (Arias-Granada et al., 2018).

### Efficient Solid Waste Management and Sanitation System

In India, 58% of the slums do not have access to a proper drainage system (Hindman, 2015). The outdoor and indoor exposure to polluted water, in addition to open defecation, has a direct impact on inhabitants' health (Nassar & Elsayed, 2018). Improvements should integrate the following features:

- **Dimensioning:** The sanitation and waste management networks should be able to accommodate the area in influence, the amount of waste generated and the number of people responsible. Shared structures shall not exceed a limit, that can be settled at 2 households (UN-HABITAT, 2004).
- **Reliability:** The sanitary services provided must be available at any time and place and under any conditions.
- **Education:** Slum upgrading programs should raise awareness about waste management and hygiene behaviours.

The Asian Development Bank settled a system of different levels of collection in a few cities of Rajasthan (Bikaner, Jaipur and Jodhpur). Slum dwellers were hired to take care of the garbage collection and cleanliness of roads. This system is now sustainable and completely funded by the inhabitants themselves (ADB, 2002).

### Streets and Public Transport

Streets and public transport networks help in creating a continuity essential to erase the rupture between formal and informal neighbourhoods. Proper streets have a great impact on social life and can serve as an outdoor extensions of living spaces; they are a vital support for commercial and



Metrocable in Medellin, Colombia

Source: Un-Habitat, 2011

cultural activities too. Thus, the transformation of the neighbourhood must preserve the community Supported framework and its social advantages.

Similarly, public transport passing through a neighbourhood provides access to basic services, jobs and other opportunities in the city (UN-HABITAT, 2014). As a structural component, the transportation network must be efficient. This is characterised by its:

- Acceptability
- Adaptability
- Accessibility
- Affordability

While integration of streets network with the informal settlements seems simple, however, it must be well planned. The new street network must be built around the existing network in order to build a coherent infrastructure for the area. Public transport and access for emergency vehicle should be clearly delimited (Sheth, 2009).

### Households and buildings

Dwellings in slums have specific characteristics: poor construction quality and organic disposition of the different households. Households in slums are usually located too close to each other and not well lit or ventilated. Redevelopments or relocations with proper space management

requires construction of new households, following three major characteristics:

Good construction quality of the new dwellings ensures sustainability of the programme over the years. Well-constructed houses coupled with a tenure security programme, gives the

citizens a sense of belonging and encourages them to stay longer (Syagga et al., 2012). This also highlights the necessity of compliance with building codes, standards and laws (UN-HABITAT, 2004). Slums households must be adaptable as per the demands of the inhabitants and the overall objectives. Several redevelopment projects

construct pre-designed buildings without adapting to the context.

For example, 26% inhabitants of Serra do Mar in Sao Paulo, Brazil faced greater expenses when they were relocated to a neighbourhood not designed as per their previous livelihood (Cavalheiro & Abiko, 2015). The needs of the dwellers play an important role during the conception process. In informal economy systems, workshops and shops are often installed within the house or in public spaces directly connected with the houses. Women, children and the elderly tend to socialize a lot within these spaces. These common areas are a vital part of the social framework of slums (Sunikka-Blank, Bardhan, & Haque, 2019). Citizen's participation is one of the best ways to identify and accommodate these specific and changing needs. For example, in Dharavi, combined housing addresses the needs of the inhabitants (Menshaw, Shafik, & khedr, 2016). After consultations and specifying their needs, the inhabitants can rent or buy the modules and then choose to extend their households later. This combined housing system provides a flexibility necessary for the families living in slums.

### Facilities

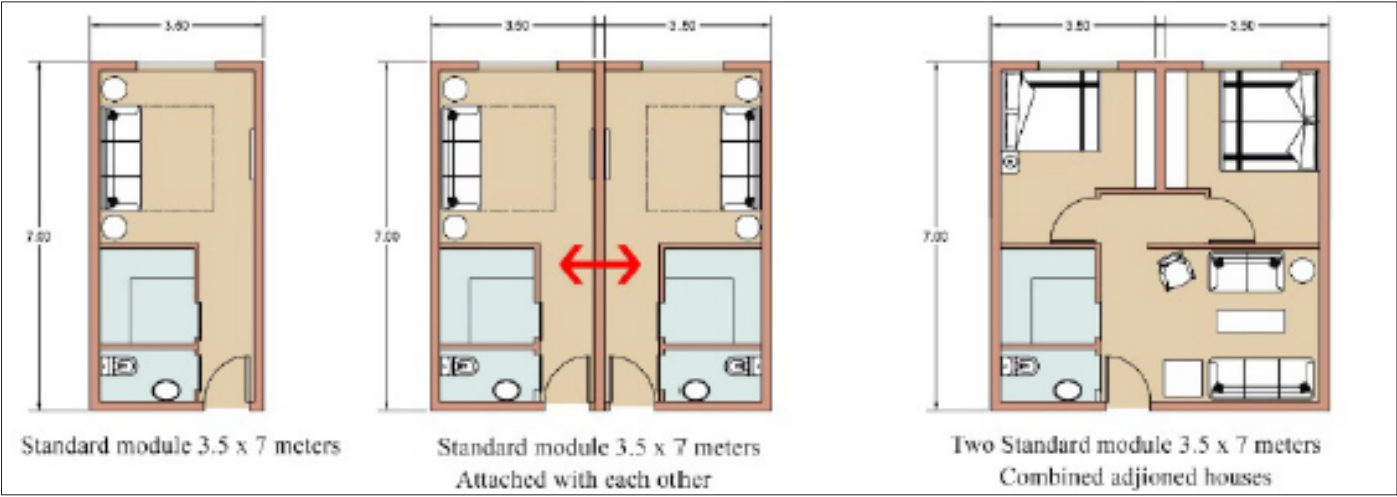
Providing proper health and education facilities help in tackling many social issues. For this, three objectives must be followed:

- **Adequate capacity:** Addressing the needs of the area the facility serves, without building oversized facilities.
- **Localisation:** Accessibility for the community and coherence with the environment and the public aimed.
- **Management:** The role of governments, NGOs and private parties in administration and funding should be defined during the first stages of conception.
- Fixing clear objectives adequate scope for such services. It has been done in the Favela Bairro programme, by fixing quotas for healthcare and teaching equipment (Maher, 2017).

### Natural hazards

Due to their irregular development without proper planning, slums are usually more vulnerable to natural disasters than conventional neighbourhoods. Although, resilient cities have started adapting to the effects of natural disasters,

Figure 1 – Combined housing (Menshaw et al., 2016)







Community Participation in the Favela Bairro Program

Source: Un-Habitat, 2011

but slums are not entirely integrated into this approach and lack protection against floods, fires and landslides (UN-HABITAT, 2014). In most cases, relocation seems like the only possible solution, the concentration however should also be on reducing the risks and hazards by (Betancur, 2007):

- Identifying zones of high risk.
- Installing infrastructures of stabilization and environment control.
- Using technologies and knowledge that reduces the risk, especially in the construction of buildings. These must follow good environmental practices.
- Educating the local population about adapted behaviours.

In Medellin, Colombia, most informal settlements were located on the hills and were subject to landslides and other geological risks. The PRIMED redevelopment project resulted in the recovery and stabilisation of 70% of high risk areas (Betancur, 2007).

## Institutional Systems

### Governance

Owners and tenants, civil society organisation, the private sector and national and local governments have different interests and visions for the neighbourhood they live in. The institutional systems must have:

- **A clear administrative structure:** Coexistence of different organisations must be organized within the project to enable collaboration and avoid the concentration of powers.
- **Clear objectives:** A commonly defined focus brings the actors together to negotiate and set basis for efficient partnerships.
- **Defined approach and methodology:** Strategies of the program must be clearly defined; it must avoid favouring and rely on partnerships with the existing social forces.
- **Transparency:** Helps the inhabitants in understanding the role of each stakeholders and the organisation, and simultaneously in preventing corruption. In Kenya, the KENSUP programme created a local authority called Settlement Executive Committee to avoid conflicts between their stakeholders (UNH, 2011). At the same time, local governments must also commit to provide infrastructure and state authorities should facilitate the implementation of policies (Cities Alliance, 2013).

### Tenure Regularization

Slum residents have varying tenure security and

are under constant risk of eviction. In Africa in 2007, more than 2,70,000 people in Africa and around 8,73,000 in Asia and Pacific suffered forced eviction (COHRE, 2009). This risk is a barrier to access credit and improve the quality of the house (Menshawy et al., 2016) (Syagga et al., 2012). Security of tenure also supports the effective implementation of legal water and energy access. The process can be monitored by a national or local government, even if community organizations and international development agencies can have a role to play (Fernandes, 2011). In Venezuela, Comites de Tierras Urbanas (Urban Land Committees) were created to regroup 150 families in average and enable them to dialogue with the State and the Technical Office for Urban Land Tenancy and Regularization (OTNRTTU) in order to become owners of their homes (Holland, 2006). There are currently 5212 of these organisations across the country. The Global Land Tool Network proposes the following Indicators to ensure a sustainable property rights regularisation (Global Land Tool Network, 2018):

- Tenure type must be engineered regarding the social context. Registered freehold may not be the ultimate objective.
- Customary land tenure processes can be promoted when they don't discriminate vulnerable social groups as poor and women.
- A participatory enumeration, a form of community participation, must be advocated to collect more precise data.
- A recording of land transactions must be carried out, over the long term, thanks to tools implemented in the short term to simplify procedures.

### Enabling affordability of households

Slums are the result of the housing markets failure to provide affordable housing (El-hadj, Faye, & Geh, 2018). Without strong policies, dwellers might have financial difficulties to stay in their new settlements. In Dharavi, one of the methods implemented considered the choice of the inhabitants to either stay or relocate to a different locality (Menshawy et al., 2016). Several examples can be a starting point for the definition of a housing policy in a slum upgrading program (El-hadj et al., 2018), like:

- **Incremental housing development:** encouraging micro finance is more adapted to unstable income and fosters self-construction from the inhabitants. The government and NGOs have a major role to play in encouraging skill development.
- **Sites and services programs:** operate a shift



An open air market

Source: Entsie, 2017

from a total public provision of housing to public assistance in private construction.

- **Rental housing:** this scheme provides flexibility in budget and location for the dwellers. The role of the private sector is predominant here, but the government should provide a legislative environment and incentives.
- Social housing: it corresponds to prices adapted to lower incomes of inhabitants. It can be provided by governments and NGOs and requires financial, human and technical resources.
- Housing cooperatives: these corporations owned by members through equity shares is adapted to the slum context because it enables the inhabitants to pool resources. The optimal size of a cooperative agency is one of the issues faced.

### Monitoring and Evaluation

Evaluating the impact of the implemented policies can improve the methods used. Today, there is a lack of this kind of systematic and complete evaluation of every slum upgrading programme (Goytia & Dorna, 2019). The key principles of a programme evaluation can be summarized through the logical framework structure keeping in mind:

- **The Inputs:** The policies implemented that operate within the various topics related in this article.
- **Outputs:** can be an increase in the dwellers' income, an better literacy rate or a drop in crime rates for example. To analyse these results, a strong database is advocated.

The programme Favela Bairrio in Rio de Janeiro,

*Cidco@Smart Vol 5, Issue 1&2, 2019*

Brazil evaluated the impacts of the upgrading project on the quality of life of the inhabitants. They compared the initial objectives to the effective benefits, using data from the beginning of the project and data collected 10 years after through surveys. The subjects covered are the residents' satisfaction, the benefits accrued to the population, and the level of infrastructure and services (Fiori, Riley, & Ramirez, 2000).

## Social Policies

### Community Participation

Top down actions and resources from higher institutions usually fail to generate local engagement and acceptance (Meredith & MacDonald, 2017). When relocating, building the project together with the inhabitants can help it correspond to their needs and avoid the failure experienced by several projects (Cavalheiro & Abiko, 2015)S. Patel, Sliuzas, & Mathur, 2015). Project managers can assess the level of community integration through the ladder of citizen participation. It characterises the degrees of popular integration in the decisionmaking process (Arnstein, 2007). Few indicators used to ensure a proper community participation can be (Betancur, 2007):

- Identifying leaders to facilitate the communication
- Enforcing the links with NGOs and community organisations
- Developing small community programs to negotiate on different topics, like, community legalisation of tenure, home relocations, etc.
- Involve the community in project development, sub-contracting, administration and evaluation

*Cidco@Smart Vol 5, Issue 1&2, 2019*

- Fostering citizen awareness and implication

The Kenyan program KENSUP also promotes subsidiarity. This principle focuses the decision-making process at the lowest level possible. As an example, in Pamoja trust in Kenya, survey responses from the citizens living inside the area provide a more accurate source of information. Inhabitants know their neighbourhood well and can reflect reality on the ground (Global Land Tool Network, 2010). Decisions thus correspond to reality.

### Gender Sensitivity

In comparison with men, women tend to spend more time in their living neighbourhood and hence are more affected by a redevelopment program (Sunikka-Blank et al., 2019). An active participation of women in the decision-making process at all levels of conception makes the neighbourhood more inclusive. Property rights control should not primarily consider men as the default choice. In 2009, women were head of one-third of all Venezuelan households (Fernandes, 2011). In the Peruvian programme of Commission for the Formalization of Informal Property, land titles were given jointly to wives and husbands (Fernandes, 2011).

### Safety

In the Kibera slum of Nairobi, Kenya, 63% of residents feel unsafe in their neighbourhood, whereas 30% of them rate safety as a basic need (UN-HABITAT, 2011). As the major issue of safety requires much attention, in Papua New Guinea, the Yumi Lukautim Mosbi project tackles it through

four pillars (UN-HABITAT, 2011):

- Promotion of sport and youth engagement
- Skill development and employment creation
- Spread of urban safety feeling through stories and media
- Community engagement

### Access to Jobs and Economic Integration

The first point is to provide accessibility to the livelihood of the inhabitants. For example, one of the major objectives of the PRIMED programme in Medellin, Colombia, is to integrate the subnormal neighbourhoods to the rest of the city and give them access to the labour market. After its implementation, 91% of the residents stated they were better linked to the city (Betancur, 2007).

Similarly, another point is to promote economic life inside the slum neighbourhood. The Kojokrom market project in Ghana chose to build 8 sheds for the local market to improve working conditions of the vendors, thereby increasing their income. They negotiated with the banks to make the interest rates for the construction affordable for locals (UN-HABITAT, 2009). Kamna Patel underlines the importance of keeping informal continuities in the slum upgrading process (K. Patel, 2013).

Governments and NGOs are also major actors to foster skill development and capacity building within the slum population. This measure can have strong links with policies of households and in-frastructure building and with community participation.



# Self-Organisation in Amsterdam:

## ■ Case-Study of Oostenburg

### Introduction

A city – a meshwork of players, comprises of people with common interests pursuing their lives in different ways. There are many unpredictable collaborations between the stakeholders to achieve their individual, commercial or political goals (Landa, 2000). These collaborations develop a pattern of connections based on the hierarchy in the society or the styles of interaction that define the community structure. Therefore, the focus of planners should be on implementing short-term, slight changes to adapt accordingly (Batty, 2011). The traditional Dutch approached planning with specific details. This included distribution of activities, spatial layout and even the visual appearance of urban blocks. The dense urban spaces left very little scope for redevelopment with lesser density and future projects. These cases can be seen in many city centres of Dutch cities having an evident mix of activities but limited scope for redevelopment.

However, Netherlands has also been trying to develop co-operation strategies among citizens, civic organizations, entrepreneurs, etc. for many years now (WRR, 2008). The new Structural vision of Amsterdam ‘Amsterdam 2040’ follows the old Dutch spatial planning approach, yet on many important points they have diverted from the previous structural plans. The emphasis in these cases is on addressing the social needs and concerns. The visual aspects are complimentary (WRR, 2008).

Organic planning (Buitelaar, 2014) focuses on creating conditions to allow diverse local initiatives for an incremental urban development. The stakeholders, here, are directly responsible in creating a demand-driven urban ecosystem (Rauws and Roo, 2015). Organic planning approaches a multi-layered view emphasizing on inter-dependence between processes of different scales and different moments (Byrne, 2003). The multi-layers of an urban system can be broadly divided into three levels (Boonstra, 2015):

- Macro – Society or neighbourhood
- Meso – Network of established players
- Micro – Group of independent agents

This new approach has brought interesting

development strategies in many neighbourhoods of Amsterdam. This article takes the case-study of Oostenburg in Amsterdam and explores the development strategy of the local authority. The neighbourhood has an interesting approach to bring diversity in activities, avoid homogeneity or polarization, encourage small-scale entrepreneurs and have temporary land uses to adapt to the changing socio-economic context. It emphasizes on realising a coherent relation between social desires and spatial development through different approaches.

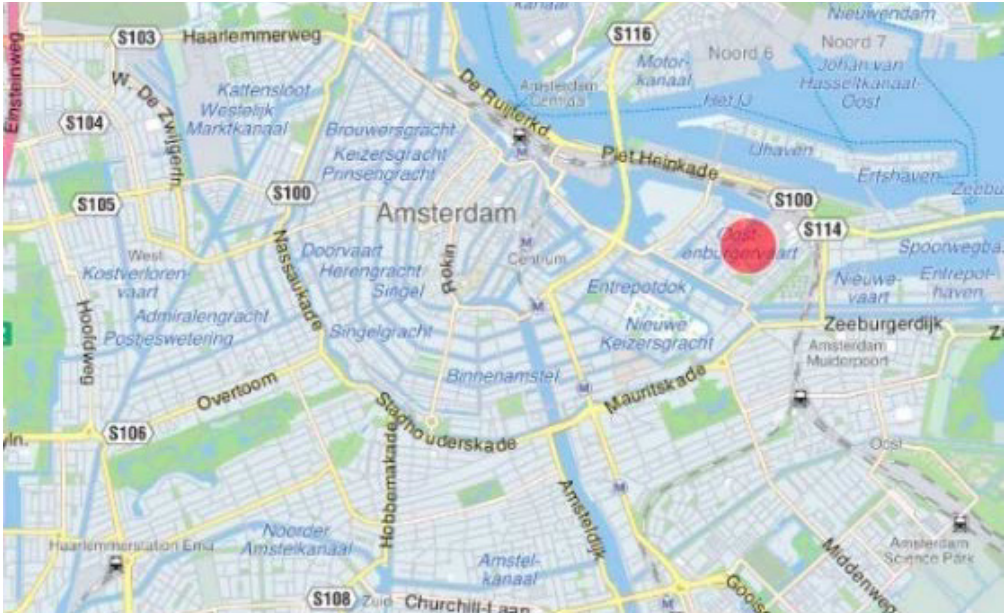
### Oostenburg, Amsterdam

Oostenburg is one of the three (Oostenburg, Kattenburg and Wittenburg) islands in the north-eastern part of Amsterdam. The island was built in the 17th century by the Dutch East India company for warehouses and a shipyard. Given the strong historical influence on its structure and planning, the municipality is taking special considerations for the conservation of the urban values. On the south-western side, four buildings of early 20th century, named after the architect Van Gandthallen, received the monument status in 2001 because it constituted “great historical, architectural and urban values” (Loos, 2014). After the collapse of the industries, the area went through a lot of clean up and regeneration. Although some parts of Werkspoor are still preserved, the island, however, lost its vibrancy with the decline of the industries and its locational isolation.

Amsterdam’s dense urbanization brings opportunities for growth in Oostenburg. The INIT building was built in 2000, it has the district’s wharf on the ground floor and offices on the upper floors. In 2004, real estate company Stadgenoot bought the Van Gendthallen buildings. For many years, many professional and cultural activities were hosted there. In 2008, Stadgenoot bought the remaining area of Oostenburg north except INIT and the south-western area.

### Decision Making Process

From 2004 to 2008, Stadgenoot made many unsuccessful plans to re-develop the area, primarily due to lack of clear vision for political and social development (Stadgenoot, 2013). These failed interventions alongside 2008 crisis



Location of Oostenbug in Amsterdam

made Stadgenoot re-strategize their development plan. Therefore, in 2011, Stadgenoot and the municipality eventually intervened with an ambition to create a mixed environment for working and living.

In the initial stages, the plan was to develop an open structure connected to the environment. Instead of developing a single master plan, the development plan was implemented in stages where the land is sold in small lots, individually. The sale and development of parcels, and investment in public spaces and facilities is taken care from the profits of the sale of previous parcels of land.

The focus was on creating a good outdoor public space and have limited vehicular access, by:

- Visualising the yard floor as a unifying element and as a medium to promote pedestrian and bicycle movement
- By avoiding traditional building block layout

In a general outlook, most of the outlines for the design and the program is fixed, but the island, on the inside, has a lot of freedom and flexibility for better spatial solutions. Through a series of products, a framework of rules for the development of the spaces were developed, this framework identifies four qualities of the island (Urhahn, 2016)

### 1. Island

Definite boundary made by the waterways, the railway embankment on one side and limited access gives the area a clear identity of an island.

### 2. Liveliness

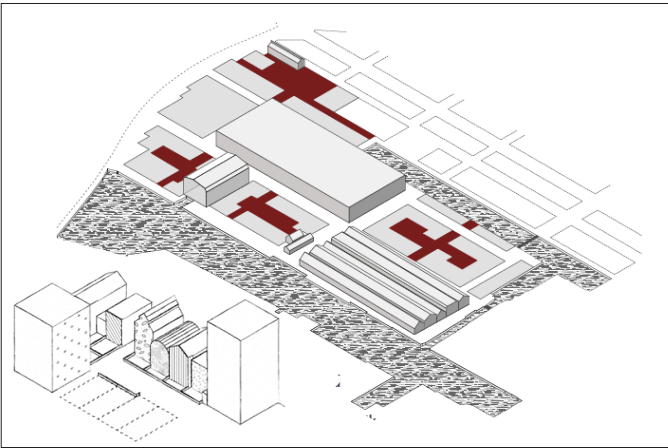
The mixed use ensures public movement and activities through the day, the public spaces of the island work as a unifying element and also becomes a utility space. The INIT and van Gendthallen buildings are capable of accommodating many exhibitions and

manufacturing at once. Simultaneously, Stadgenoot wishes to provide houses for low-income groups in a limited area. The remaining plots will be sold to private owners to recover the break-even cost.

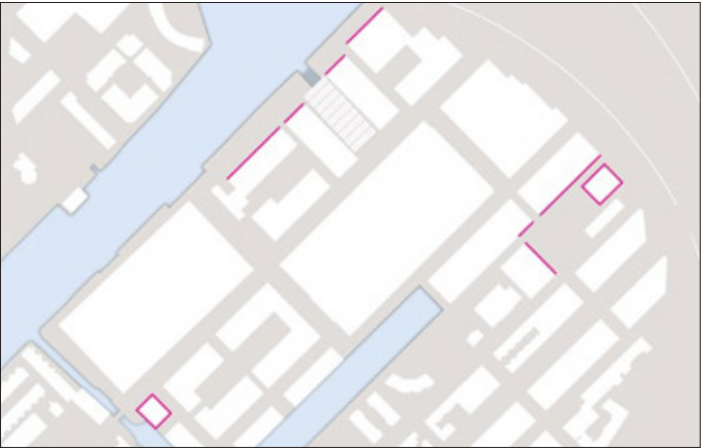
A higher plinth and plots’ grouping encloses the

inner yards. This brings privacy in the inner yards and parks, makes it quieter and allows the owners to use it as per their needs & convenience. The limited traffic movement and open plinth of the INIT & van Gendthallen buildings makes the use of outer spaces possible.

Figure 2 – Quality 2 - Liveliness



1. Coherent design of the inner yards. The green space can have



2. The areas marked in red are to be opened at the ground level and are preferred for public activities

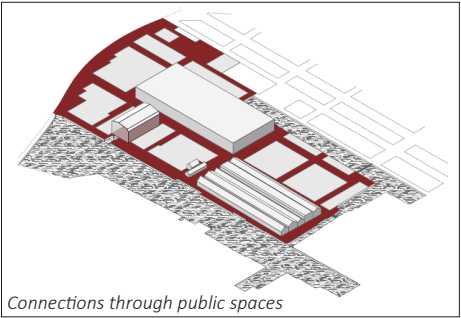


3. Around 2 levels Variation in height in relation with the adjacent building

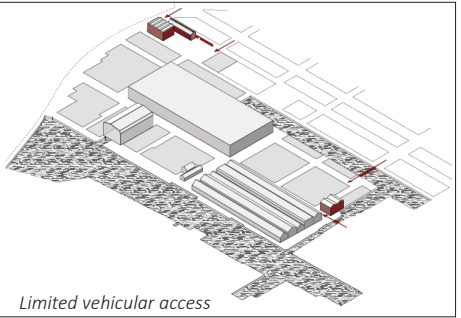


4. Variation in height of around 1 level in relation to the adjacent building

Source – Urhahn, 2012



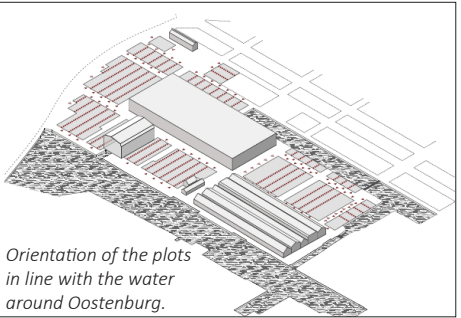
Connections through public spaces



Limited vehicular access

Figure 1 – Quality 1 - Island

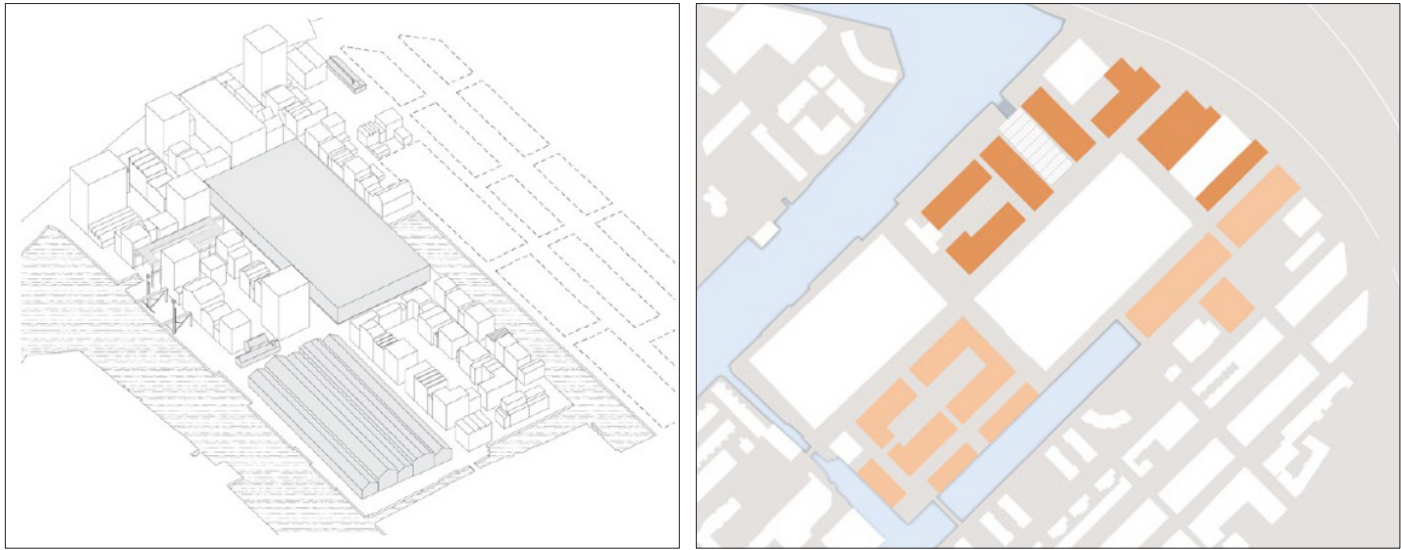
Source: Urhahn, 2012



Orientation of the plots in line with the water around Oostenburg.

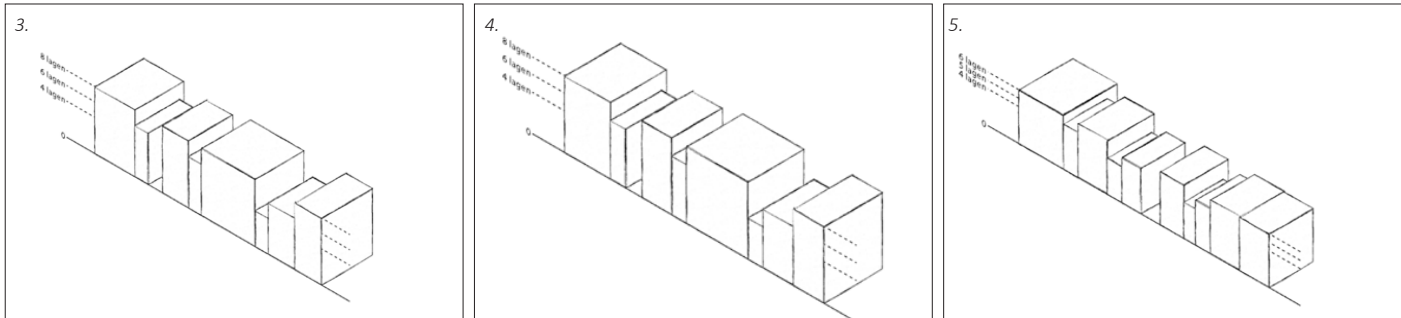


Figure 3 – Quality 3 - Contrast



Small grain v/s large industrial plots

Variation in lot width; darker – Max. width 24 m., lighter – Max. width 18 m.



3. Variation in height of around 2 levels in relation to the adjacent building

4. Variation in height of around 1 level in relation to the adjacent building

5. Variation in roof shapes. Entrances (hatched) have a special roof shape

Source: Urhahn, 2012

3. Contrast

The neighbourhood has an industrial presence but also accommodates bars & restaurants. The architecture and activities are diverse.

To ensure contrast in activities and the architecture, the land owned by Stadgenoot is being developed in parcels. Size of the plots varies; the development plan suggests maximum width of a plot but does not put any restrictions on the depth. The plot width is coupled with the front orientation of the buildings. There is a lot of scope for variation in height, roof shape, activities in the plot, etc. The distribution of activities for the neighbourhood is fixed as 50% each (live-work). These areas are kept car free and will have spaces reserved for public greens in

the centre of the parcel. There are at least three variations proposed for the height of the building. The proposed layout places a building of smaller height between two higher buildings to create visual contrast in the arrangement of the buildings and provide light and air through the cluster of the buildings.

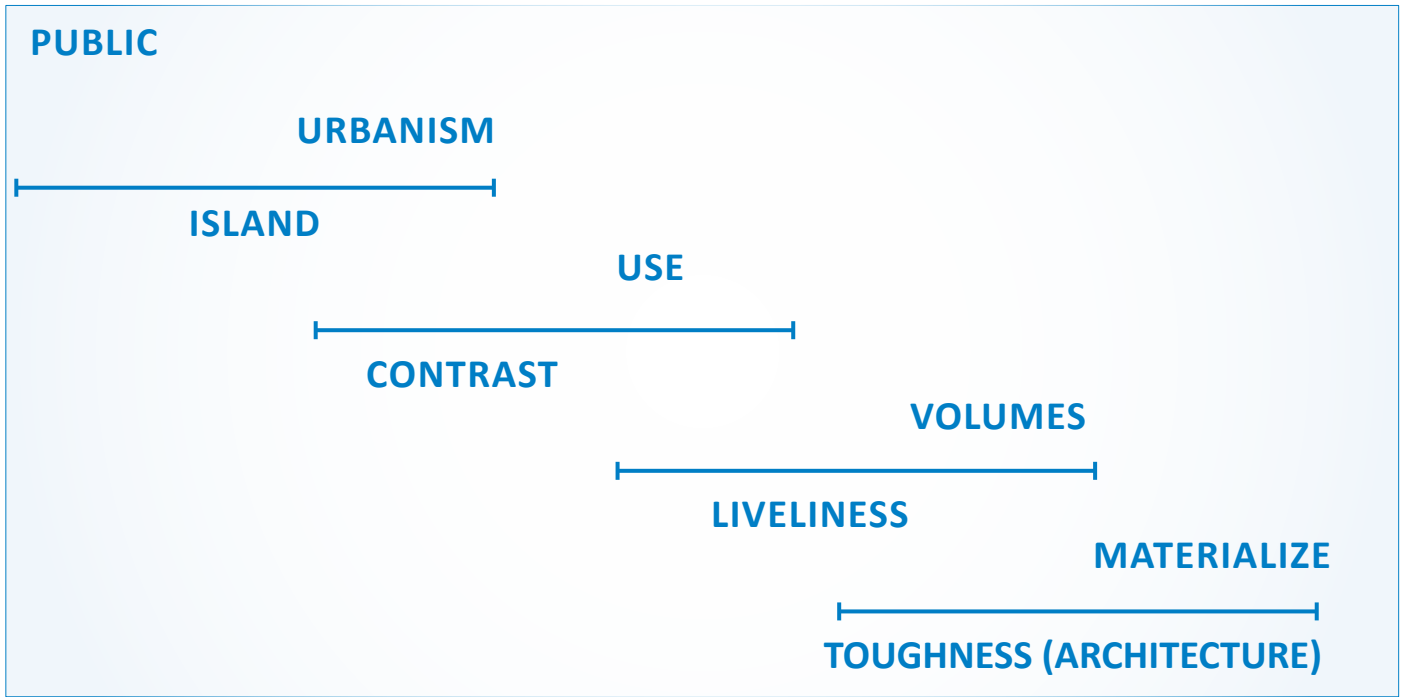
4. Toughness

The heavy industrial history and the rugged architecture gives a strong visual impression and an identity to the island. The older buildings in Oostenburg appear as a single block with simple but robust detailing. The activities opening on the yard floor worked as a unifying element.

The development plan follows the same line of visual appearance around the van Gendthallen building. The indoor and outdoor public spaces run into each other. The roofs of the buildings are decided on what fits best, they do receive proper attention and are not cut-off abruptly. Aiming for a higher level of interaction and liveliness, balconies on the side of the street are encouraged, especially if the side is waterfront. The buildings are more open towards the side facing the water.

Oostenburg is relatively dense and has limited scope for greenery. Hence, the users are suggested to develop green roofs and install solar panels. The industrial image is enhanced by the steel balconies, openness of the buildings and rugged style of architecture.

Figure 4 The four qualities and the sub-categories within the qualities.



Source – Urhahn, 2012; Gemeente, Amsterdam

These four qualities further has sub-categories (mentioned in figure 5) and bring forward a framework focusing on six key issues:

- 1. Society:** Implement mixed use and encourage adaptive re-use
- 2. Mobility:** Limited access for cars, focus on more soft mobility
- 3. Material:** Preserving the island's historical significance
- 4. Water:** To reduce the water consumption
- 5. Energy:** Reduce energy consumption
- 6. Biodiversity:** Possibility to grow native plants in the dense urban area

Van Gendthallen building offers temporary work spaces capable of adapting to different needs of different organisations. The offices in INIT building and nightlife in Roest is already active. This mix of activities makes Oostenburg capable of attracting public and keep the place active.

Response

The land in Oostenburg is of high demand due to its location and proximity with the city centre. The sale of the plots in the first parcel began in 2017. Currently, sale of DIY plots in the 9<sup>th</sup> parcel is active and construction in 5 parcels is under-going (Oostenburg.nl, 2019). The end of construction is stated to be around the end of 2020.

CONCLUSION

The outcomes of these cases manifests specific physical growth, urban form and morphological or functional patterns. It allows the urban systems to distribute the decision-making power to its diverse actors and avoid the dominance of a single actor (or activity). It's tendency to self-organise the development safeguards the interests of the actors and maintains a dynamic socio-spatial nature (Boonstra, 2015).

The distinctions (agency, rules and physical order) in decision-making process carry out the transformation process in their own way. This results in a complex environment capable of self-

Figure 5 Parcel distribution in Oostenburg. The parcels marked in red are under construction, the areas marked in blue are upcoming projects.



Source – Oostenburg.nl, 2019

organising itself through multiple interventions. The development plan has four design principles (Rauws, 2015):

1. Small-scale sub-plans
2. Incremental development strategies
3. Carrying structures
4. Loose rules

It is also important to understand that these development plans are highly contextual and depend on the level of interaction. The planners' style of intervention and the style of mediation in this complex set-up depends on the context and the understanding of the social system (Tan, Bekkering, and Reijndorp, 2014). A good interaction among the actors can only come with

a strong sense of community building. It may not be active and prevalent in every case. Therefore, such a solution can be implemented only after a deep understanding of the neighbourhood or the city. In absence of strong and dense pre-existing networks, taking an intervention like this can be too much work, even if the actors are skilful and committed (Uitermark, 2015).

From the case-study, it is also evident that the nature of organic planning is not entirely self-organising. It requires interventions at multiple-levels to safeguard the interests of the actors. Therefore, the true role of the actors and the level of freedom they eventually enjoy while developing their spaces is always in question.



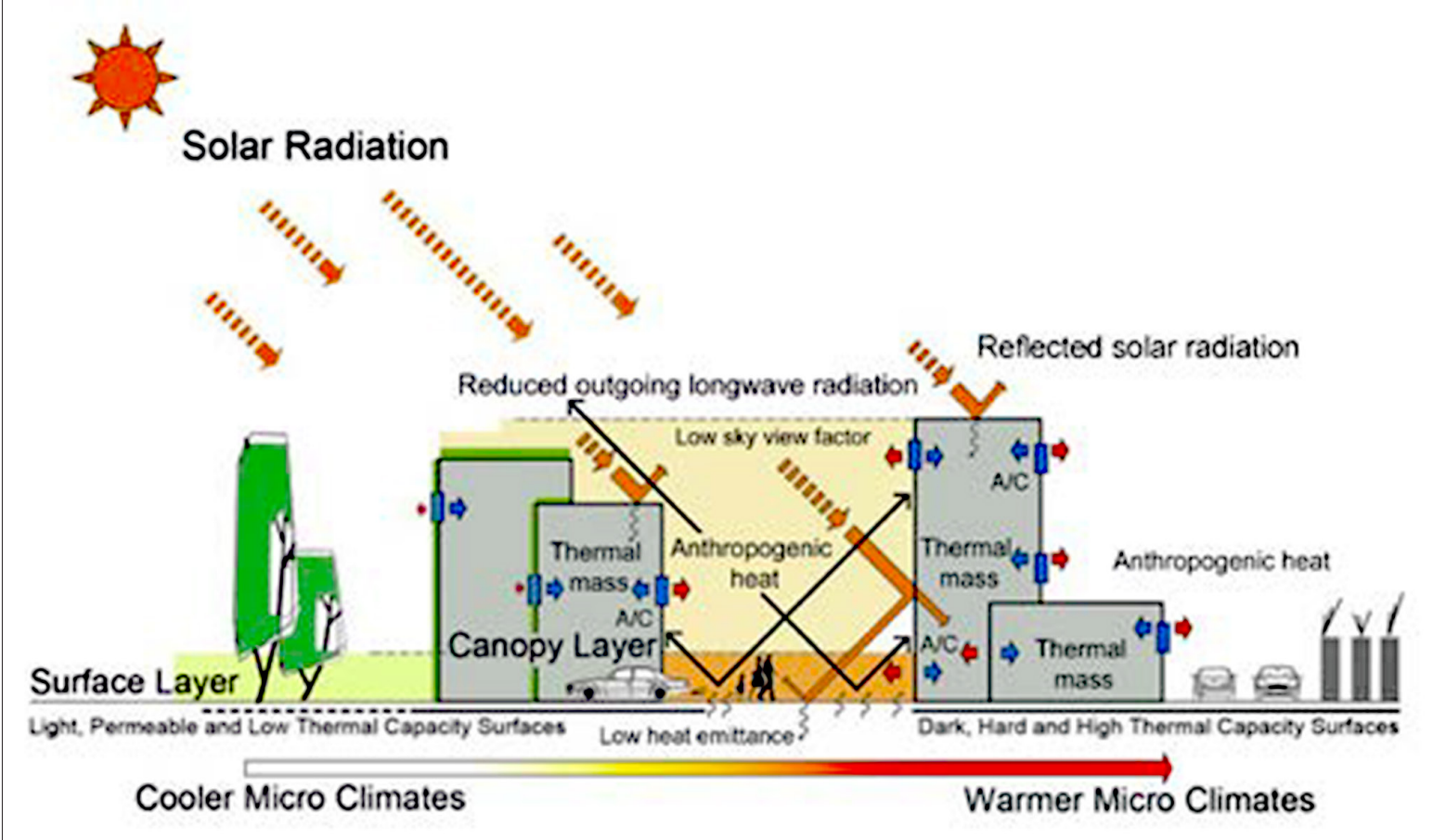
# Urban Heat Island Effect

## Causes and Remedies

Development in the urban areas causes changes in the landscape. Vegetation and open space is replaced by the buildings and infrastructure and the permeable surfaces get converted into impermeable surfaces. In a typical urban area, the surfaces are darker, impermeable and the vegetation is relatively lesser. The modified land surface in cities, compared to rural environments affects the storage and transfer of both radiative and turbulent heat (Parvantis, Stigka, Fotiadi, & Mihalakakou, 2015). The leads to a phenomenon where the heat gets accumulated due to the urban construction and other human activities leading to urban heat island (UHI) effect. The most noted observation about UHI effect is that the temperature of urban region is higher than the rural region (EPA, 2008). This difference can be as much as 2.50C during the summers (Akbari et al, 2001). The urban heat island phenomenon is caused by two factors:

- intrinsic nature of cities (anthropogenic activities like vehicles, air conditioners, etc. along with buildings’ morphology, urban canopy, wind blocking, surface characters and land use planning forming the urban structure of a city)
- extrinsic factors (climate, prevailing weather circumstances and the seasons)

These factors increase the energy consumption in buildings in the effort of providing thermal comfort and results in increased air pollution, eventually leading to increased greenhouse gas emissions and negative impact on health of citizens of developing cities (TERI, 2017). It has been noted that 1° C rise in temperature leads to 2-4% increase in electricity consumption (Akbari et al, 2001). Urban flooding during heavy rains, traffic congestion along with higher level of air pollution, diminishing lakes, increase in temperatures during summer are some of the negative environmental impacts on a city due to rapid urbanization (TERI, 2017). . These environmental impacts are a result



Factors responsible for Urban Heat Island Effect

of the combination of Urban Heat Island and Global Warming effect. This article talks about the Urban Heat Island effect and explores the cooling strategies adopted by Sydney to reduce the impact.

### Causes and Effect of Urban Heat Island

Due to the lack of green spaces and the effect of the intrinsic and external factors discussed above, surface temperature rises (Osmond, 2017). Natural surfaces absorb more radiation in comparison to man-made structures like roads and buildings having lower albedo. As a result, natural surfaces is always cooler than an urban surface. Evaporation from water releases energy and cools the surface temperature. As the heat capacity of asphalt and concrete is lower than other types of surfaces, the solar radiations falling on the built surface causes the air temperature to rise. Therefore, rise in surface and air temperature is directly proportional to the height of the built-up areas. Conditions of the available natural resources

and the climate in the urban ecological system is affected by the increased surface temperature (Ningrum, 2018).

### Urban Heat Island and Climate Change

Changes and development in radiative and thermal properties of urban infrastructure are causes of Urban Heat Island. Also, the functioning of a buildings has impacts on the local micro-climate, for example, the rate of cooling at night is slowed down by tall buildings. The heating effect occurring in cities or specific areas leads to a change in the climatic conditions of the region leading to local climate change. Local climate change is different from global climate change; their effects are limited to the local scale and decreases as the distance increases. Global climate change caused by increase in sun’s intensity or greenhouse gas concentrations are not locally or regionally confined (EPA, 2008).

### Adaptation and Mitigation Strategies

Urban areas need better development planning and a balance between social, ecological and economic factors. The correct ratio of built-up and open spaces, control over the growth of built-up areas, more sensitivity for the open spaces are few of the many things required. This can be done through spatial development planning associated with sustainable development and creating a comfortable urban environment. Some of the adaptation strategies can be:

- Developing the green and blue areas within a city
- Managing the growth of built-up areas of the buildings

Suitable areas can be developed by forming roof gardens or more trees can be accommodated in the streets as they are a better heat-stress suppressor (Ningrum, 2018). To mitigate the urban heat island effect, the thermal environment around the buildings should be improved by using material of lower absorptivity, larger thermal conductivity and higher reflectivity (Ningrum,

Source – Osmond, 2017

2018). Durable white roofing materials and cool coloured roofing available for coating, tiles, painted metals, and fiberglass asphalt shingles are being produced by manufacturers (Akbari, 2016). To directly reduce the energy use in buildings, shading devices, trees and cool-roofs should be installed more often. In addition to cool roofs, urban vegetation and higher albedo and emissivity pavements reduce the temperature of the surroundings by a few degrees (Akbari, 2016). For water drainage, many paving materials and paving surface technologies have been characterized such as coloured concrete, white topping, chip seals, permeable pavements and grasscrete. These cool paving technologies are currently used in many specific applications (Akbari, 2016).

Effective urban cooling in a city requires the correct strategy of cooling depending on the available factors, factors like the state of development, aspect ratio, sky view factor. Inner city/ CBD, inner and outer suburb areas have different strategies for urban cooling and should

be carefully examined as per the character of the city before implementing. Local weather conditions and spatial configurations should also be carefully considered before the application of urban cooling methods. The urban context of the cities can be divided in three categories (Osmond, 2017):

- **Inner cities:** Tall buildings surround the public spaces. Due to the shade of the buildings, urban surfaces are partially protected from the solar radiations. Therefore, in smaller public spaces like plazas, pedestrian open air malls, using high emittance cool-paving and building envelope treatments prevents ventilation and facilitates less heat storage.
- **Inner suburbs:** Two to six storey buildings surround the public spaces and due to the shade of the buildings, public spaces are partially protected from solar radiations. Depending on the city’s latitude, solar radiations may also reach the public spaces. To complete the shadow over urban canyons or around plazas temporary and tree canopy shade may be used.
- **Outer suburbs:** The development is low density in many cities and has a high sky view factor. Typically, in this urban form, areas comprise mainly of single or double storey buildings. The public spaces are generally not protected by the solar radiations by the shade of the surrounded buildings. Therefore, the main sources of shade in the plazas are tree canopy and shading structures.

### Case-Study: UHI In Sydney

#### Intrinsic and extrinsic factors

Summers in Sydney are typically hot and humid. Highest monthly mean temperature of the city is 25.9 degree Celsius and daily sunshine during summers is of 7.1 hours on an average. With the maximum monthly mean rainfall of 117 mm, rainfall in summer is slightly lower than in autumn but higher than spring and winter (Osmond, 2017). The studies suggest that the Urban Heat Island Intensity (UHII) ranged from a mean of about 2-4o C and average daily peaks of 7o C (Parvantis, Stigka, Fotiadi, & Mihalakakou, 2015). Sydney increasingly experiences the UHII due to its numerous urban development projects (Sharifi & Lehmann, 2014). It is estimated that the combined effect of Global Warming and UHI will increase the temperatures by 3.7o C (Argüeso, Evans, Fita, & Bormann, 2014). The temperature in the urban areas ranges between 1.1o to 3.7o C as compared to the rural areas (ranging between 0.8o to 2.6o

C), the UHII is much bigger during the nights (Parvantis, Stigka, Fotiadi, & Mihalakakou, 2015).

#### Suitable Urban Cooling Strategies

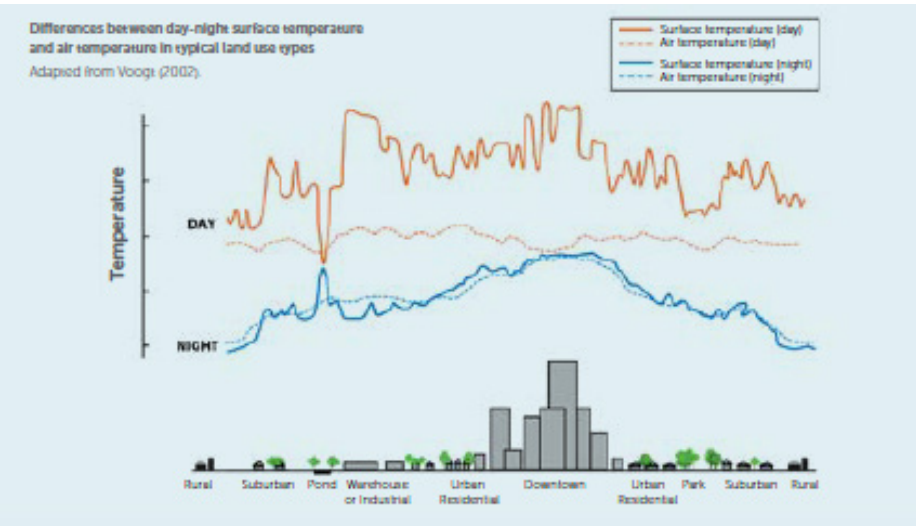
Depending on Sydney’s intrinsic and external factors, suggested strategies are more effective (Osmond, 2017):

- When the relative humidity in Sydney is high, the effect on outdoor thermal comfort by evaporative cooling and surface water will be lower. Central Sydney and eastern suburbs benefit from regular sea breezes in the summer afternoon improve the cooling effect of water. Misting fans for temporary cooling at pedestrian scale is pretty effective.
- Sydney usually receives high level of UV radiations and solar intensity during summer. Thus, the best suitable strategy is shading and increased tree canopy especially in higher density urban region.
- During most of the summer days, maximum temperature stays below 30 degree Celsius but surpasses 35 degree Celsius on some occasions. To radiate the urban heat away, the best practice is to use the high emittance paving. While addressing storm water management, permeable paving is a good option for urban cooling as Sydney has an average annual rainfall of 1221 mm.
- In low pedestrian and car traffic areas, especially in the CBD area, high albedo paving is a possible urban cooling strategy.

### Conclusion

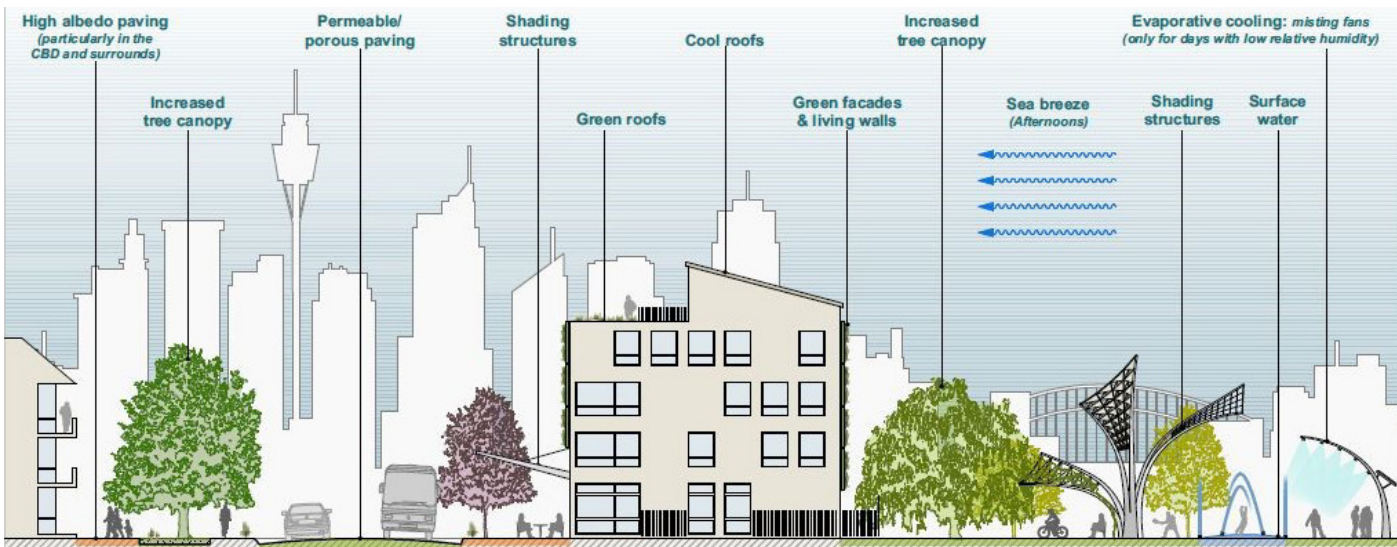
Humans are the main contributor to the urban heat island effect and solely responsible for the intrinsic factors of the urban heat island effect. Insulated buildings design and changes in human behaviour can reduce the energy consumption utilised to cool the indoor environment at the expense of heating up the outdoors. Climate responsive building designs can be really useful in minimizing the use of air conditioning by reducing the indoor temperatures during heat wave (Osmond, 2017).

The energy efficient measures such as increased level of insulation in roofs and walls, appropriate orientation, increased shading and application of reflective painting on the building envelope can develop better heat resistance in a building. The integration of these design techniques and adaptation in existing and new building designs could effectively reduce air conditioning and increase the indoor thermal comfort of the occupant.



Differences between day-night surface temperature and air temperature in typical land use types.

Source – Osmond, 2017



Source – Osmond, 2017



# Towards Better Air Quality:

## ▪ Case study of London’s LEZ

### Introduction

Noxious air quality and its long-term effects on human health has been a growing concern for many years now. WHO estimates that outdoor air pollution is responsible for 29% of all deaths and diseases leading to lung cancer. It also has an impact on brain and heart diseases, and on reproductive system (WHO, n.d.). The air pollution is more dangerous for infants, children and the elderly. In London, the inhabitants lives in an area exceeding World Health Organization guidelines for air quality (TfL, 2019). More than 9000 people die every year in London because of air pollution (GLA, 2017). It has been found that the most deprived areas and the lower-income dwellers were also the most exposed places to air pollution (Kelly, 2011). It shows that tackling the issue of air quality relates to tackling various other linked social issues, such as social inequalities for example.

Air pollution is today characterized by the presence of specific components. The World Health Organisation identified the most harmful pollutants before editing guidelines to limit their concentration. They are:

- PM for Particule Matters, categorised by the size of the particle (PM<sub>10</sub> is particles with a diameter of less than ten micrometres (µm)).
- NO<sub>2</sub> for nitrogen dioxide
- Ozone and sulfure dioxide

London is mostly concerned by the PM and NO<sub>2</sub> pollutants (GLA, 2017) (AEA, 2003) where the road transportation has a major role to play. Half of the NO<sub>2</sub>, PM<sub>2.5</sub> and PM<sub>10</sub> emissions are produced by the vehicles on the roads in greater London (GLA, 2017). In 2008, the city had the worst outdoor air quality in UK and one of the worst of Europe (TfL, 2008). Moreover, the authorities always had the obligation to work towards EU quality norms whose first policies on the subject were launched in 2005 (European Commission, 2017).

Since the 2000’s, the number of Low Emission Zones (LEZ) initiatives in Europe has increased, with leading cities in Sweden and Italy. In September 2017, there were 227 LEZ in 12 countries in Europe (Ademe, 2018). The principle idea is to tackle the traffic congestion on roads and performance of the vehicles. These two factors are responsible for a greater part of the air pollution in our congested and dense cities. On similar lines, the London city hall decided to implement a Low Emission Zone (LEZ) as the key action to tackle its issue of rising air pollution. The LEZ enforces exclusion of the polluting vehicles from a zone including the city. Through the interventions, emissions are projected to consequently reduce and incite people and companies to buy modern and cleaner vehicles. This article explores the case study of the LEZ in London and looks into their interventions and regulations taken by the authorities to regulate the issue of increasing air pollution in London.

### The London Low Emission Zone

The analysis of London’s air quality in 2003

showed that emissions were already decreasing due to better performing new vehicles. The objective was to accelerate this trend in order to reach WHO’s guidelines faster, and to ensure every area in Greater London achieve it (AEA, 2003). To do so, the Low Emission Zone was introduced in 2008. Two policies were to be implemented through the LEZ:

- decrease in the number of vehicles on the road
- modernization of the fleet in order to reduce individual emissions.

The proposal for a Low Emission Zone came directly from the Mayor Transport Strategy and the Mayor of London in 2006 (Wilson, 2006). The scheme is now managed by Transport for London (TfL). Moreover, the London Local Air Quality Management (LLAQM) agency was created in 2016. It monitors air quality in each borough in the capital. Their role is to declare the places exceeding limit values, ensure an Action Plan is in place and updated, and annually report the monitoring.

### Objectives

In 2008, the data below gives an idea of the situation before the implementation of the LEZ. All indicators are above the WHO limits. The objectives of the London LEZ are as following (GLA, 2017):

- Reduce exposure at priority locations such as schools, and tackling inequalities.
- Compliance with UK and EU limits concerning air pollutants.
- Reach WHO guidelines by 2030. These are more ambitious than EU limits because they concentrate solely on the health issues and do not emphasise on the environmental aspects.

	PM <sub>2.5</sub>	PM <sub>10</sub>	NO <sub>2</sub>
WHO	10	20	40
London 2008	10.5 – 15.9 (Bk – RS)	22 – 28.7	41.1 – 57.2

Source London : (Wood, 2015)

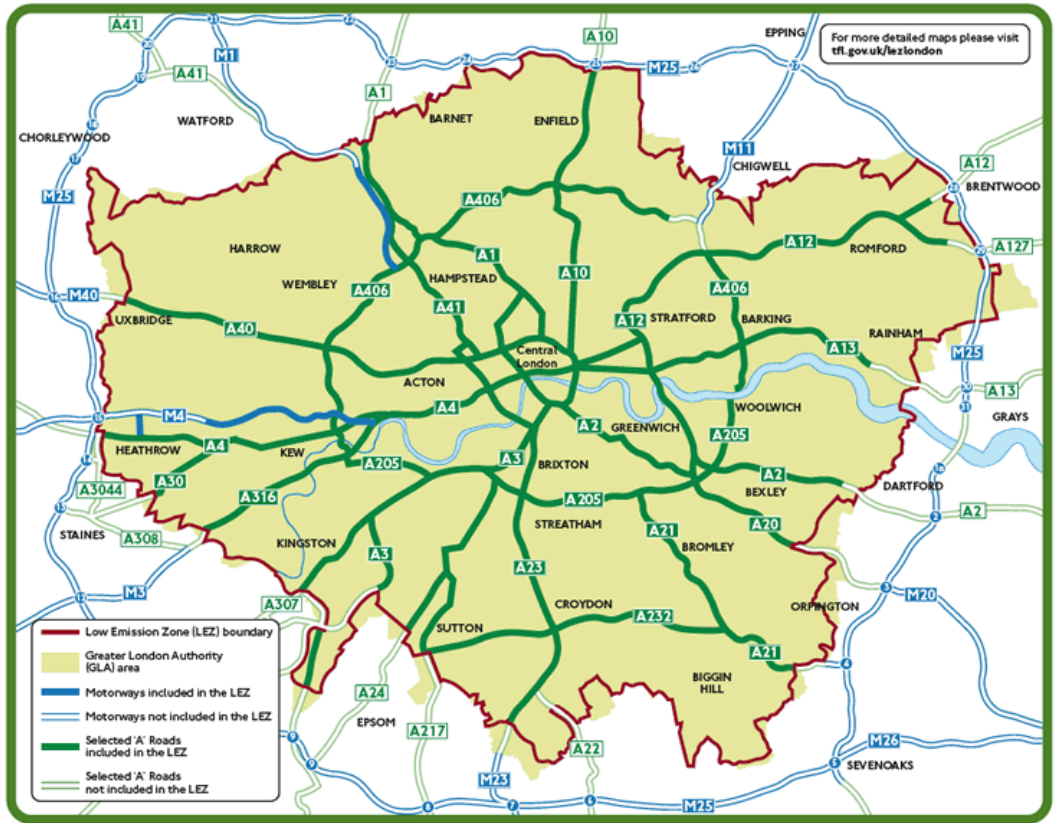
*In all the data analysis, figures are expressed in annual mean concentration (µg/m3) rather than in emissions (tonnes) because the aim is to evaluate the impact on population’s health. To compare data from different sources, the best choice is the annual mean concentration. There are 2 figures for the data for London. The first correspond to a background measurement station (Bk), and the second from a railway station (RS), far more exposed.*

### Implementation

The LEZ covers all local roads in Greater London, Heathrow airport and parts of the M1 and M4 motorways (Ellison, 2013). It operates at all times of the year and cars and motorcycles are not included in the scheme. There are 3 main interventions taken under the LEZ:

### Euro Norms for Vehicles Performances

The criteria of vehicle compliance are based on Euro norms, or European Emission Standards.



Boundaries of the London Low Emission Zone

Source: Transport for London, 2008

These are labels characterizing a vehicle’s emissions of PM and NOx. The higher the number, the more restrictive the norm. A small synopsis has been explained in figure 2. The implementation of the LEZ follows 4 stages. This incremental process attempts to reach the initial goal without generating a crisis for the vehicle users because of restrictions.

It was noted that the London LEZ has a national impact as a large proportion of the national fleet comes to London at any given time (AEA, 2003). The indicators are fixed in a way to find a balance between costs to industry and the impact on air quality. A last Stage 5 was added to reach Euro IV norm for NOx for the bus fleet of London. The main objective is to become the first zero-emission bus fleet in Europe.

### Surveillance and Economic System

In order to control the access to the LEZ, TfL installed a CCTV surveillance system at multiple locations in London. Fixed or mobile cameras can read license plates and create a database of the violators. This information is then compared to the database from different organisations that identifies each vehicle in Great Britain. TfL reported a acceptance rate of over 95% for every phase of the implementation (Ademe, 2018). In 2008, It was predicted that this monitoring system would cost £50 million and each year, the running costs would be £80million. It was also predicted that the system would also yield £5 to £7 million through fines and entry taxes (TfL, 2008). Users can pay to enter the LEZ with a non-compliant vehicle, providing a daily fee from £100 to £200. Infractions are punished by a fine from £500 to £1000.

### Congestion Charge Zone

The municipality also settled a Congestion Charge zone in 2003 to enter in the central London area. It operates from 7am to 6pm during

Cidco@Smart Vol 5, Issue 1&2, 2019

Figure 2 – The 4 stages of the Euro norms

	Stage 1	Stage 2	Stage 3	Stage 4
	2/2008	7/2008	1/2012	1/2012
	Heavy vehicles >12t	Heavy vehicles >3,5t	Large vans and minibuses	Heavy vehicles >3,5t
	Euro III	Euro III	Euro III or dated after 2012	Euro IV or dated after 2016

- Euro 6 for diesel cars
- Euro VI for heavy vehicles.

The vehicles not meeting the emission standards will have to pay £12.5 for light vehicles, and £100 for heavy vehicles. This fee is in addition to the congestion charge that operates in the same area. Its boundaries are proposed to be extended in October 2021 to the northern and southern circular roads of London (TfL, 2019).

Since 2008, many other initiatives have also emerged. Transport for London launched a Freight Quality Partnership to set up a dialogue with freight industry, local governments and environmental groups. Good construction logistic practices, cleaner technologies and night-time deliveries are some of their projects to limit the impact of freight delivery on air quality (AQAP, 2008).

The Energy Master Plan of London also plays a role in air pollution reduction. An important part of emissions is due to residential heating and the use of bad quality fuels, for example 37% of NOx emissions (GLA, 2017). Implementing and promoting a decentralised energy network tackles part of the issue. Here, the local authorities provide heat and power demand locally and can therefore control the origin of this energy by privileging cleaner energy production systems (GLA, 2017). This is also a way to regain a local control on the polluting sector. This contribution is vital as a great part of London’s air pollution comes from its outer borders (Walton, 2015).

This last observation underlines the necessity of collaborations for national and European policies to tackle air quality issues. London authorities relies on data and information provided by the Convention on Long-Range Transboundary Air Pollution adopted in 1979. It has been ratified by most countries of Europe and North America and

identifies specific measures to be taken by parties to cut their emissions (UNECE, 2018).

### Evolution and Impacts

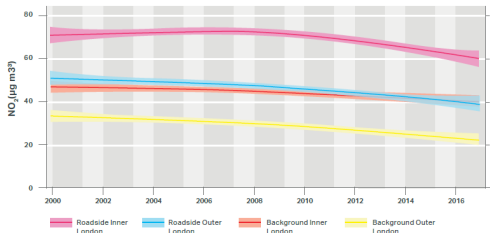
The graphs below present the decrease in concentrations of pollutants in the air after 8 years of implementation. There is a considerable reduction due to the direct impact of the LEZ policy. However, we can qualify this assessment by looking more closely at the different graphs. The WHO objectives in roadside or inner London is yet to be achieved and there hasn’t been any significant changes in the levels of PM<sub>2.5</sub>. The most polluted areas still lack in providing proper quality of life to inhabitants. This amelioration might not be only due to the LEZ implementation. Many factors have to be taken into account, however we can reasonably think that the impact on road transport has been significant.

### Conclusion

Air pollution in India is a major crisis and needs immediate attention. A similar intervention or other innovative solutions can help in significantly reducing traffic and concentration in pollutants. However, the context in Indian cities is completely different than in London, and this solution must be studied before any implementation in order to adapt it to the local situation.

The experience of the Low Emission Zone in London shows that city-scaled pragmatic action lead to concrete results. However, a LEZ alone is not sufficient to reach the WHO’s requirements. Many efforts still must be done on other sectors such as industries, housing or non-road transport. Moreover, it is important to note that improving the air quality and reducing the pollution is a global concern. The upcoming challenge is to gather these various ambitions into collective action from the cities, the governments and the international agencies.

Figure 3 – Trends in NO<sub>2</sub> in London – 2000 to 2016



The London Air Quality Network and analysis by King’s College London

Cidco@Smart Vol 5, Issue 1&2, 2019

Figure 4 – Trends in PM<sub>10</sub> in London – 2004 to 2016

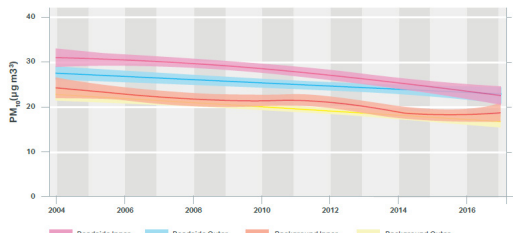
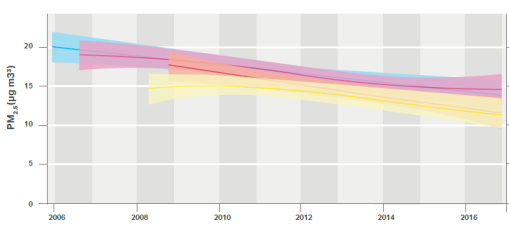


Figure 5 – Trends in PM<sub>2.5</sub> in London – 2004 to 2016



Source: Greater London Authority, 2017



# Urban Food Systems:

## Case Study of Baltimore Food Policy Initiative

### Introduction

A highly urbanised world puts tremendous influence and demand on the food systems, affecting their management, functioning and performance (Fang et al., 2017). The diet of the people and the style of production and distribution of food affects its accessibility, affordability, the related job opportunities, etc. Currently, the cities lack relevant data and empirical analysis on food systems (Fang et al., 2017). The lack of data leads to lack in understanding issues and prioritising relevant projects and programs. Inefficiency of policies leads to inequitable access to food leading to creation of food deserts.

An area’ where inhabitants have low access to affordable and healthy food is referred as a food desert. The definition and the way to measure it varies. Some focus on the number of stores within a specific distance (Hendrickson, Smith, & Eikenberry, 2006), and some other emphasize the quality of food available (Cummins & Macintyre, 2002). The John Hopkins Centre for a Liveable Future, designates an areas as a food desert if (Biehl et al., 2017):

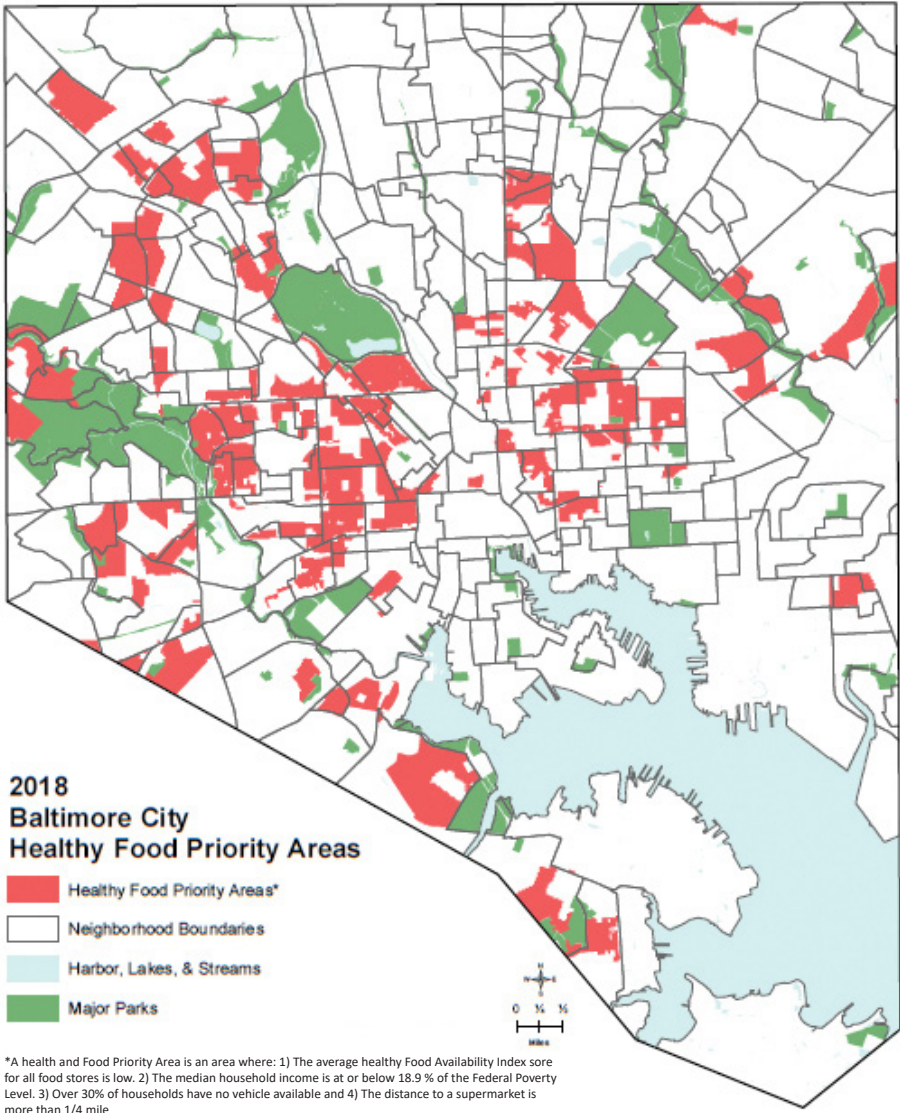
- The distance to a supermarket is above ¼ mile
- The median household income is at or below 185% of the Federal Poverty Level.
- Over 30% of households do not have a vehicle available.
- Healthy Food Availability- The average Healthy Food Availability Index score for all food stores is low.

In 2017, 12.5% of the population of US didn’t have proper access to healthy and affordable food (Feeding America, 2019) mainly because of 2 reasons:

1. The lack of financial resources(Breyer & Voss-Andreae, 2013).
2. Supermarkets and groceries lacking accessibility due to higher logistical cost (Walker, Keane, & Burke, 2010). Testimonies and case studies show people travelling 1h to reach the first affordable supermarket (Butler, 2018).

As people tend to make food choices based on the availability in his/her surrounding areas (Furey, Strugnell, & McIveen, 2001), food deserts have a high impact on the inhabitant’s health. Being far from a supermarket or in an inaccessible environment favours an unhealthy diet (Moore, Diez Roux, Nettleton, & Jacobs, 2008)(Rose & Richards, 2007) resulting into obesity and hypertension. Food desert is also a matter of inequality. Morland et al. showed that in the US, poorer neighbourhoods have more small corner grocery stores. Smaller shops are more likely to offer lesser choice and lack fresh and healthier products (Laska, Borradaile, Tester, Foster, & Gittelsohn, 2009; Block & Kouba, 2007).

Food deserts exemplifies strong impacts of spatial environment on social issues. In the early 2000’s, it was often neglected in urban planning practices due to many speculations like considering it as an issue in the rural areas, etc. (Pothukuchi &



Baltimore City’s food deserts.

Source: Misiaszek, Buzogany, & Freishtat, 2018

Kaufman, 2000). However, it is rather important to understand that cities need to implement policies in order to have an positive impact on food accessibility. This article will focus on the case of the Baltimore Food Policy Initiative, in the USA. It shows different methods they used to obtain concrete results concerning food security and food deserts in Baltimore.

### The Baltimore Food Policy Initiative

#### Food insecurity

Food insecurity is the inability to provide “access to all people at all times to enough food for an active, healthy life” (USDA, 2018). Food deserts are identified based on two indicators: the food insecurity rate and the Healthy Food Availability Index (HFAI). The collection of data enables the authorities to draw an overview of the food desert and food insecurity problems in Baltimore. They measure accessibility as well as quality of the accessible food.

In 2015, the food insecurity rate in the US was 13.4% . In comparison, Baltimore city was at 23.2% (Feeding America, 2019), and 23.8% in 2014 (Biehl et al., 2017).

The HFAI is derived from the Nutrition Environment Measures Survey for Stores. It is calculated by awarding points regarding the availability of healthy food options like products containing whole-wheat grain or proteins

(Misiaszek, Buzogany, & Freishtat, 2018). It ranks from 0 to 28.5, and a higher score indicates the presence of healthier food. The table (Figure 1) provides data on the city of Baltimore. We see that even though supermarkets present a higher HFAI, the majority of the city’s stores are around 9 and present less possibilities for residents of the surrounding neighbourhoods.

#### Origins of BFPI

From the early 2000’s, various individual efforts started taking place in Baltimore to tackle the food insecurity (Santo, Yong, & Palmer, 2014). To bring these stakeholders together, the mayor of Baltimore launched in 2009 the Baltimore Food Policy Task Force and released a list of recommendations as a roadmap for action for a healthy and sustainable food system (Santo et al., 2014). In 2010, this led to the the establishment of the Baltimore Food Policy Initiative (BFPI), a new intergovernmental collaboration. The Food Policy Action Coalition puts together as much as 60 Baltimore stakeholders (NGOs, farms, universities, businesses, hospitals, residents) with the objective to drive a concrete implementation of recommendations (Santo et al., 2014; City of Baltimore, 2018).

The objective of the Baltimore Food Policy Initiative is to “improve health outcomes by increasing access to healthy affordable food in Baltimore City’s food deserts” (City of Baltimore, 2018). Its actions can be parted in 3 axes:

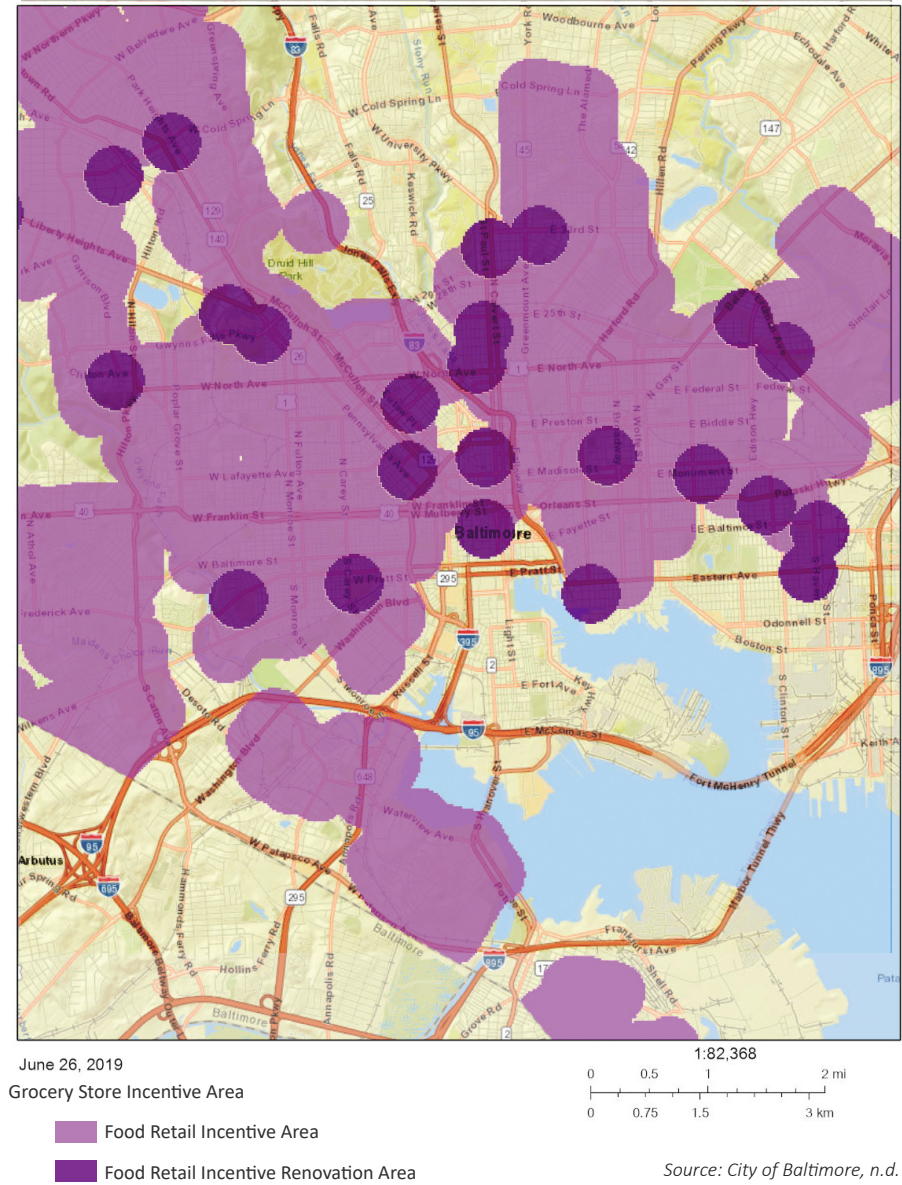
Figure 1 – Baltimore City’s food deserts

Store Type	Number	HFAI Score			%SNAP	%WIC
	Surveyed	Range	Average	Median		
Supermarket	47	23.5-28.5	27.7	27.5	97.9%	74.5%
Small Grocery and Corner Stores	525	0-23.5	9.0	9.0	78.1%	19.6%
Convenience	183	0-18	9.3	9.5	93.4%	1.0%
Public Market	6	5.20	14.0	16.25	83.3%	0.0%
Overall	761				78.2%	15.9%

Healthy Food Availability Index Findings

(Misiaszek, Buzogany, & Freishtat, 2018)

Figure 3 – Map of the Grocery Store Incentive Areas



- Bring together a wide spectral of different actors in order to share information on food security subjects, and advise the city’s work on it.
- Designate Resident Food Equity Advisors (RFEA). It is a group of citizens who represent all the city’s districts, and have an influence on the choices and policies (City of Baltimore, 2018).
- Coordinate academic and research institutions work, who collect, analyse and disseminate data. The partners are John Hopkins Centre for Liveable Future, Bloomberg School of Public Health, and different universities (Swartz, Santo, & A. Neff, 2018).

To lead these actions, the BFPI adopted the Healthy Food Environment Strategy to have precise priorities (City of Baltimore, 2018). They cover

- **Actions on supply:** increase the number of (City

- of Baltimore, n.d.) stores and the quality of food proposed
- **Actions on demand:** promote nutrition assistance and address food accessibility
- **Promotion of alternatives:** promote grassroots initiatives (with the help of RFEA) and urban agriculture

BFPI acts at a local level, even if it can advocate on policies at state and federal level. They work with organizations in order to improve practices, and change regulations at the city level.

#### Actions

One of the city level policies is the personal property tax credits policy. Renovation or location of new stores in Grocery Store Incentive Areas give access to an 80% credit on furniture, fixtures and equipment over 10 years. The Grocery Store

Incentive Areas have a covers large portions of Baltimore (Figure 3), it concerns (City of Baltimore, 2018):

- Food deserts
- The zones situated within a ¼ mile distance from a food desert
- Zones that would be a food desert without the presence of a supermarket

Stores can qualify for the tax reduction only if a significant part of their sale is dedicated to fresh fruits and vegetables (City of Baltimore, 2018).

The BFPI also launched the Homegrown Baltimore programme. The objective is divided in 3 components:

- **Grow local** - Promote urban agriculture
- **Buy local** – Link producers and consumers with farm markets and make arrangements between farmers and schools, institutions and universities
- **Eat local** - Provide education and incentives to promote consumption of locally produced food

For example, a partnership with the Managerial and Professional Society enables their employees to earn 250\$ on participating in CSA (Community Supported Agriculture). In a survey held in 2014, 85% of the participants agreed that participating in CSA has motivated them to eat more vegetables. However, this programme still has a relatively lower impact concerning only 120 city employees (BFPI, 2015).

At the city level, BFPI also legislates health vending machines, food trucks, hoop houses and animal husbandry. Simultaneously, BFPI has also cooperated with the Maryland state and at federal level. For example, their influence led in the adaptation of the SNAP (Supplemental Nutrition Assistance Program) to make it more sustainable for small businesses and increase the number of stores proposing this option. SNAP is a supplement to food budget for low-income families that encourages the purchase of healthy food. SNAP programme has lowered food insecurity by at least 18% for its participants (Mykerezi & Mills, 2010).

Some indicators give an overall idea of the impact of the BFPI policies in the city of Baltimore. The Feeding America website indicates that in 2017, 21,3% of the Baltimore citizens lived in food insecurity, compared to the 23,2% in 2015 (Feeding America, 2019). BFPI were a part of the Milan Urban Food Policy Pact and received an award in 2016 for their use of intergovernmental collaboration.

### Conclusion

The majority of these policies concentrate on adapting the offer. Accessibility, affordability and diversity are essential to enable everyone to consume healthier food. However, this is not sufficient, and policies for health and food security must also act based on demand. Concerning health issues, studies show that it is more efficient to act at the household level by improving the nutritional quality of the diets in comparison with the neighbourhood level by providing a supermarket or a store (Ver Ploeg & Wilde, 2018). BFPI proposes to focus on local solutions such as food assistance, targeted food price subsidies, or nutrition education. Use of behavioural economics is also been used to improve sales of healthy products in small retail stores (Mancino, Guthrie, & Just, 2018). These are new solutions to explore and involves various actors. The example of Baltimore illustrates how cities can have an impact on the reduction of food deserts. It affects the inhabitant’s health through the enhancement of their quality of life.



# Impact of Urban Morphology on Social Life:

## ■ Case-Study of La Duchère, Lyon

### Introduction

Buildings and public space morphology strongly impact the living communities. Social interaction is one of the major design elements in urban planning. Apart from providing a living space for the inhabitants, housing should also offer spaces for public life to incubate. Building such neighbourhoods is a challenge with no perfect solution. However, in the late 90s, the outline of an ideal emerged (Urban Task Force, 1999). This ideal advocates compact and interconnected neighbourhoods, a mix of use and a variety of housing types, detailed below:

- **Interconnected neighbourhoods:** Any urban unit is always in interaction with its environment. Pedestrian friendly areas are advocated because they encourage sustainable and inclusive mobility network. However, it doesn't mean cars should be moved out of the city. Despite their negative impact on quality of life, they are essential to deliver complete mobility solutions (Congress for the new urbanism, 2001).
- **Compactness:** With the objective of preserving the natural land, it is essential to favour use of brownfields and reuse built areas. It enables connecting amenities inside and outside the neighbourhood. Neighbourhoods should have a discernible centre and defined borders, enabling citizens to quickly identify how the city can support social life (Urban Task Force, 1999). The proximity of inhabitants and activities is a way to enhance involvement in the community, through more interactions between people.
- **Mix of use:** Linking mobility with mixed land use reduces the burden on the transportation system (Urban Task Force, 1999). A mixed land use makes the neighbourhood more attractive and liveable. It improves the level of social interaction within the area.
- **Housing diversity:** Just like mixed land use, a broad range of housing types is essential in

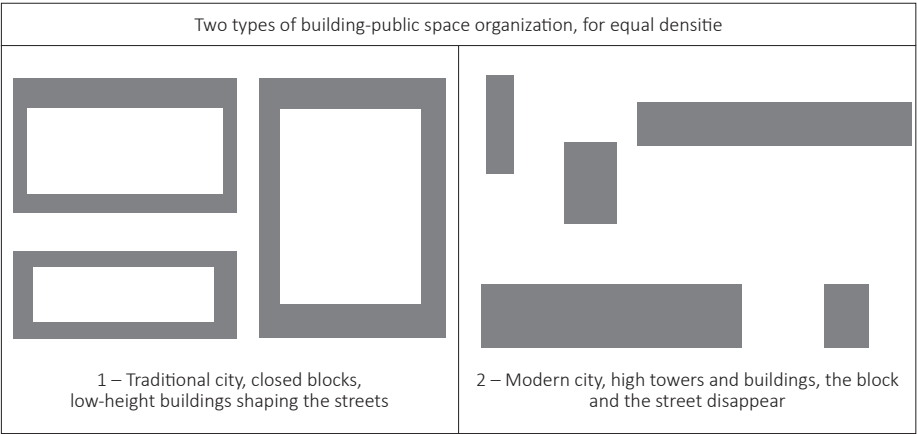
creating a sense of community. At the same time, it is necessary to allocate tenures for social housing. It attracts people of diverse ages, ethnicities, and incomes (Congress for the new urbanism, 2001). Thus, interaction between different parts of the society, enhanced by compactness and mix of activities, leads to an enriched community.

However, things were not the same in the 50s. In this period, France faced a nationwide housing shortage. In 1946, there were 5 million inhabitants without proper housing facilities (Fourcaut, 2010), slums began to develop in cities' outskirts and the city centre dwellings suffered hygiene and sanitary issues. The urgency for the need of housing infrastructure started rising. The French government responded to this crisis by building rapidly and in large proportions (Fourcaut, 2010). The newly created neighbourhoods had all the necessary equipment: schools, shops, public services and places of worship. It corresponded to the ideals of modernity of the time, and the comfort provided contrasted with the former living conditions of the inhabitants (Hersemul, 2016). This article analyses the impact of the urban form of these constructed buildings on the inhabitants and their social relations. It explores the case study of La Duchère in Lyon, France, a housing project representative of this category. It is currently in a state of flux, implying a concrete transformation of its urban morphology.

### La Duchère

The preferred form of buildings in La Duchère is that of long and high buildings. In addition to high density, these buildings have an economic benefit to construction. The crane is installed on rails and builds housing along a straight line, following the "Crane Road Technology" (Bachelet, Bres, Djirikian & Lot, 2006). The road network is similarly structured around a North-South breakthrough

Figure 1 - How the Shape of Buildings Determines Public Space.



(Source: Allain, 2014)



Source: GPV La Duchère, 2018

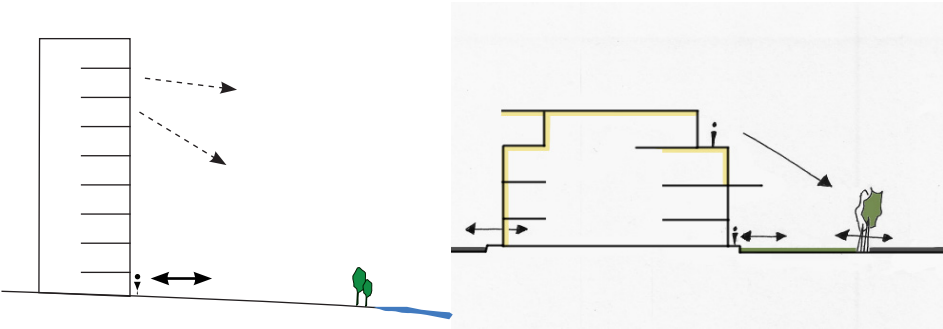
within the neighbourhood. The urban form of the entire neighbourhood is therefore determined by this criterion of simplicity. The urban block disappears to favour an operational framework. The high density of buildings free up spaces to integrate vast public spaces. This is how the traditional street disappears, as the road frame remains on the periphery and circumvents the set it without entering it.

### The Decay of a Social System

The response of inhabitants to these buildings is heterogeneous. Some of them boast larger, airy and bright housing, especially compared to previous insalubrious housing (Dagues, 2019). On the other hand, critical voices raise, concerning the same kind of housing projects in France.

Cidco@Smart Vol 5, Issue 1&2, 2019

Figure 2 – Relation with the street between a high building and an urban block



Promiscuity is deplored, while public spaces are vast but empty (Tchernia, 1960). These testimonies started bringing about considerations that quickly highlighted the weaknesses of the urban construction of the district. Public spaces are omnipresent on the ground, but remain empty and little invested by the inhabitants, whose high up habitat is not connected to these spaces (Urban Task Force, 1999). It was then realized that the buildings, through their morphology, eliminated the relationship with the street (Urban Task Force, 1999). These features are representative of a specific architecture regarded as overwhelming cubic and monotonous blocks (Tchernia, 1960).

The zoning method is privileged in the neighbourhoods of French housing projects built during the 50s (Fourcaut, 2010). The functions are clearly separated in areas of work, housing, traffic or recreation. This form of urbanization, even with high density, is not conducive to socialization. The inhabitants meet less new acquaintances and have fewer close relations (Mouratidis, 2018).

In addition, green spaces are also rare in La Duchère, despite its direct proximity with the Vallon Park. It is an underutilized asset that is totally cut off from the neighbourhood due to the disruption by the massive buildings. Prior to the time of construction, this rupture is also present between the district of La Duchère and surrounding neighbourhoods. There are very few connexions amongst the inhabitants despite being close to each other spatially. Due to the north-south road breakthrough, there is a scarcity of east-west traffic preventing any dialogue with surrounding areas, particularly because of the real rupture in the urban space created by the "barre des 1000", long tall buildings extending from north to south.

### A Physical Renewal

The proximity of the buildings gives a perception of many social interactions. However, they are limited to the corridor or the building. While for any suburban neighbourhood, the spatial environment of social interactions can be easily expanded (Grafmeyer, 1998).

From the observations, a common objective emerged. The goal is to recreate a new scheme of social relations by physically transforming the neighbourhood. In 2001, Le Grand Lyon launched the "Grand Projet de Ville" at La Duchère, a large-scale operation to revitalize the troubled neighbourhood. A steering committee of stakeholders at national, regional and local level was composed to determine the political orientations for the project. It was coordinated by "Mission Lyon la Duchère", an organisation created to coordinate citizen participation and maintain a coherence. In the meetings, groups of citizens express their needs and aspirations for their habitat and control if the commitments are respected. Finally, the realised proposal of neighbourhood regeneration is assigned to different organisations. A team of 3 architects designs the urban transformation and an urban planning society, SERL, coordinates the tendering process.

The choices to demolish "barre des 1000", the numerous transformations of the buildings and public spaces impacted the neighbourhood's morphology. By doing so, three modes of development came forward:

1. Replacing 15-storey buildings with medium-sized buildings (maximum of 7 floors) helped in recreating the lost relationship with the street, while maintaining a similar density. More openings are now created towards the street, in contrast with the former buildings that only had few main entrances leading to parking space.

Figure 3: A Neighbourhood Isolated from its Surroundings



Source: GPV La Duchère, 2018

Cidco@Smart Vol 5, Issue 1&2, 2019



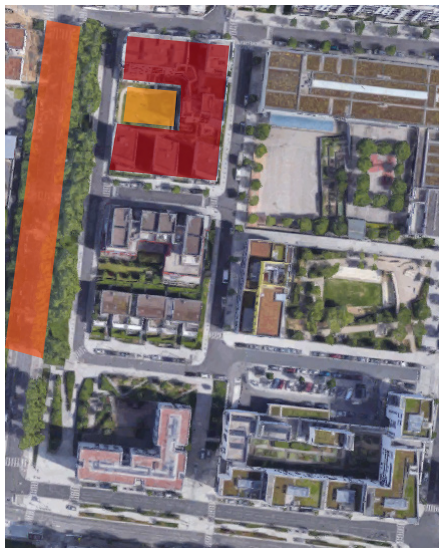
Figure 4– The renovation project



Source: GVP La Duchère, 2018

- Seeing the street from the window makes it possible to consider one's dwelling as part of the urban space and in relation with its other inhabitants (Urban Task Force, 1997). Through this, social interactions are expected to be no longer limited to the corridor or the building.
- The newly created urban blocks integrate the public green spaces within them. This design intervention has two functions:
    - First, the urban space becomes more permeable for the surrounding natural spaces that become a part of the neighbourhood and provides a better quality of life for its inhabitants.
    - While being located inside the islets, these places are now accessible to all. A buffer space between the public and the private sector works as a place of exchange to favour more social interaction. Inhabitants can

Figure 5- The transition in perception from private to public space



Source: GVP La Duchère, 2018



Source: GVP La Duchère, 2018

have different levels of privacy and thus, have different opportunities for diversified social interactions.

- New habitat forms are more heterogeneous, in order to overcome the monotony criticized by the inhabitants. The coordinating organization “Mission Lyon La Duchère” launched numerous architecture competition for each block, leading to a myriad of architectural styles. They clearly make a rupture with the brutalist and functionalist architecture of the former long buildings. The scale of the neighbourhood seems more human and pleasant.

The transformation of the image of the neighbourhood also promotes a diversity in the interactions. One of the major issues of the rehabilitation was to ensure a broad range of social profiles within the inhabitants. The neighbourhood decreased its affordable housing share from 80% to 55%. New services, like a gymnasium, shops and café-restaurants were also accommodated. The project now invites enterprises to establish their businesses in the sector. Office buildings are built next to the living places. This way, the neighbourhood is more dynamic, and people have reasons to go out in the street.

To support this new dynamism, a spacious plaza at the centre of La Duchère has become the heart of citizens' life. Adding urban furniture like stairs and trees help in making it a pleasant place, at all times even when it is empty. Streets organization was also enhanced. By eliminating the rupture created by the “barre des 1000”, east-west traffic lanes emerge. They form a physical link with the surrounding neighbourhoods and helps in limiting the social isolation suffered by the housing project. The pedestrians now have a choice of different paths to access, each offering a different experience of the neighbourhood. This enables the public spaces to encourage more interaction between the people, buildings and services.

### Conclusion

The transformation of the district of La Duchère now lasts for 16 years and is expected to end by 2025. This project has been carried out over a long term in order to perceive the impact of the urban project on the social functioning of the district. The first analysis draws a positive assessment, as in 2014, 67% of the inhabitants thought that the quality of life has been significantly enhanced (GVP La Duchère, 2018). The last parts of the project must complete this development in order to achieve a real success.

This neighbourhood was a pioneer in 1958 for the new French housing policy. In 2018, it is pioneering innovative urban forms. These initiatives are inspired by many projects all around the world, and can inspire many others. The case of La Duchère is useful for cities struggling with social issues in some neighbourhoods, or seeking for any urban transformation. It is already possible to analyse the consequences of urban transformations, and to see to what extent it is applicable to another context.

In any case, those neighbourhoods, deeply and voluntarily transformed, must be subject to a constant interest, as understanding the habitat in its social context is essential to ensure sustainable development of future urban spaces.



Evolution of public space

Source: Lyon Figaro, 1991



Source: GVP La Duchère, 2018



# Urban Sanitation and Waste water challenge of India:

## Imperative of Water Demand Management and Non-Sewered Sanitation Systems

### Summary

During the last major drought of 1986-88 in India, there was large scale crop failure and cattle deaths in central and western India. Yet but did not have a drinking water crisis of acute magnitude that is currently happening year after year all over India.

Two-thirds of India is semi-arid and arid. In this context, drinking water security should be seen as a challenge of reducing dependence on external water supply, maximum in situ water harvesting, recharge and reuse of treated water.

Guiding policy framework for urban sanitation should be a paradigm shift from supply side solutions to water demand management and reducing the wastewater footprint.

The most effective way to implement water demand management is through regulation. For water harvesting, treatment and re use of treated waste water (for non-drinking purposes) at the household and colony/housing society level. Chennai made water harvesting a compulsory requirement to its building rules<sup>1</sup>, while Bengaluru<sup>2</sup> achieved it by making residential societies and commercial and educational institutions set up their own waste water treatment plants and encourage waste water reuse.

Water, specially drinking water, is a human right. India is signatory to the 2010 UN Declaration on Right to Water and Sanitation. *“The new Jal Shakti (water) Ministry promises to deliver “Nal se Jal” (tap water) using surface and ground water, depending on the region, and pushing for conservation and sustainability to balance supply.”*<sup>3</sup>

However, more household tap-water connections and sanitation facilities will result in more wastewater generation. One of the most effective ways of reducing the wastewater footprint of cities is possible by focusing on decentralized Non-Sewered Sanitation (NSS) solutions.

Managing water demand, reducing wastewater footprint and reuse of treated wastewater from our STPs and decentralised Faecal Sewage Treatment Plant (FSTP) should be prioritised to progress towards achieving the aim of providing tap water for every household by 2024.

### Sanitation and Urbanisation in India

Increasing urbanization of India is putting significant pressure on the available water resources and the safe disposal of waste water. Most cities are facing increasing water stress and are reaching the limits of accessing drinking water from all available sources and a grave crisis of untreated waste water generation.

The total urban population of India, as per Census of India (2011), was 377 million, spread across 7935 urban centres- 4041 statutory towns and 3894 census towns. Statutory towns are

administered by Urban Local Bodies responsible for delivery of infrastructure services and census towns are administered via rural administration; provision of urban services is not mandatory in these areas. Though the number of census towns has trebled over a decade, the increase in number of statutory towns has been much slower.

Table 1. Urban Centres in India

Types of Urban Units and numbers	Census 2001	Census 2011
Statutory towns	3,799	4,041
Census towns	1,362	3,894
Urban agglomeration	384	475
Out growths	962	981

Source: Census of India 2011, Office of the Registrar General & Census Commissioner, Ministry of Home Affairs, Government of India.

As per the 2011 census, only 32.7% of urban households’ toilets are connected to the sewer systems. The Central Pollution Control Board(CPCB) 2015 report stated that the sewage generated nationwide is 62,000 MLD, whereas, the developed sewage treatment capacity is only of 22,940 MLD. Due to this hiatus in sewage treatment capacity about 38,791 MLD of untreated sewage (62% of the total sewage) is discharged directly into nearby water bodies.

CPCB reported that there are 920 Sewage Treatment Plants in different States/UTs, out of which, 615 were operational, 80 non-operational, 154 were under construction and 71 in the planning stage.

Recently, there is a conspicuous movement to use treated wastewater from STPs to fill lakes or to recharge ground water, even if it entails huge pumping and transportation cost of treated wastewater many miles away. Use of treated wastewater in industrial sector has been prevalent for many years. Now the practice has started gaining momentum in the urban areas for using treated waste for filling up lakes and water bodies in peri-urban areas (being planned for Bengaluru and other towns).

### Drying cities: Managing Water Demand

India’s share of world population is 17% and have only 4% of world’s renewable fresh water resources (Ministry of Water Resources, 2012). The World Bank anticipates 50% increase in urban water demand in the next 30 years. For India, this timeline may be even shorter.<sup>4</sup> Water Demand Projections by the International Water Management Institute show that India has underestimated water withdrawals by 3-14%. Globally, the total domestic water use already exceeds the forecasts for 2025 and demand of water for irrigation is much higher than expected.<sup>5</sup>

Drinking water requirements of a growing city have to be met along while addressing critical aspects of:

- Adequacy and frequency of water supply
- Affordability and pricing
- Water quality
- Institutional sustainability of the water utilities

There is a large dependence on ground water for meeting urban households’ water requirements. “Overall, 50 per cent of urban water requirement and 85 per cent of rural domestic water need are fulfilled by groundwater.”<sup>6</sup>

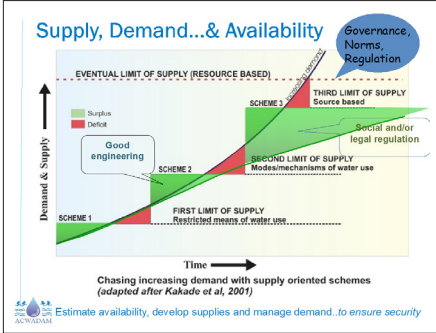
Some of the challenges faced are:

- **Drying and polluted aquifers**, competing and increasing demand from agriculture is reducing the opportunities for expanding water supply.
- **Dumping of untreated waste** in rivers and water bodies, is creating a public health hazard and great loss to bio-diversity.
- **Unequal access** to drinking water supply within a city, competing demand with industrial and agriculture needs, is creating water conflicts at many levels- urban-rural, agriculture-industry, intra urban conflicts over water supply and disposal of waste water.

**Climate change** is also going to impact the availability of water supply for Indian cities; due to increasing variability in temperature, leading to dramatic changes in reservoir levels (flooding and droughts) and water supply to cities.

As we reach the **limits to groundwater withdrawal** and exploit all available surface water resources, governance and regulation will be needed to manage water resources. Figure 1 shows the limits to water supply attained with every technological advancement.

Figure 1 - Limit to water supply with every technological advancement



Source: UNDP Report<sup>7</sup>

From open wells under Scheme 1 to bore wells, there was a quantum jump in ground water withdrawal from deeper aquifers. We are at a stage that only demand management (through regulation, norms and governance) can expand the available water to meet our needs. It raises the needs to identify new technologies that can:

- Be applied to water conservation and efficient use and re use of treated water
- Define norms for usage, regulations and enforcement.

Cidco@Smart Vol 5, Issue 1&2, 2019

All this requires community/social engagement, institutional and legal backing.

### Non-Sewered Sanitation Systems in Odisha

Non-Sewered Sanitation (NSS) systems by definition are sanitation systems that treat human faecal waste without the need of traditional pipes and water supply gravity flow based conveyance systems connected with Sewage Treatment Plants(STPs). These are usually smaller sized natural or mechanical/membrane based decentralised treatment systems called Faecal Sludge Treatment Plants(FSTPs). They secure faecal waste from household septic tanks through trucks and other motorised transport. The waste is then treated as per standards for safe disposal of treated waste water and solids for composting or burning into char for safe disposal. In some towns, farmers use faecal sludge from septic tanks as manure on their fields. This is an informal arrangement that is not considered safe for disposal of waste water and Septage but is being done in Bengaluru and other towns.

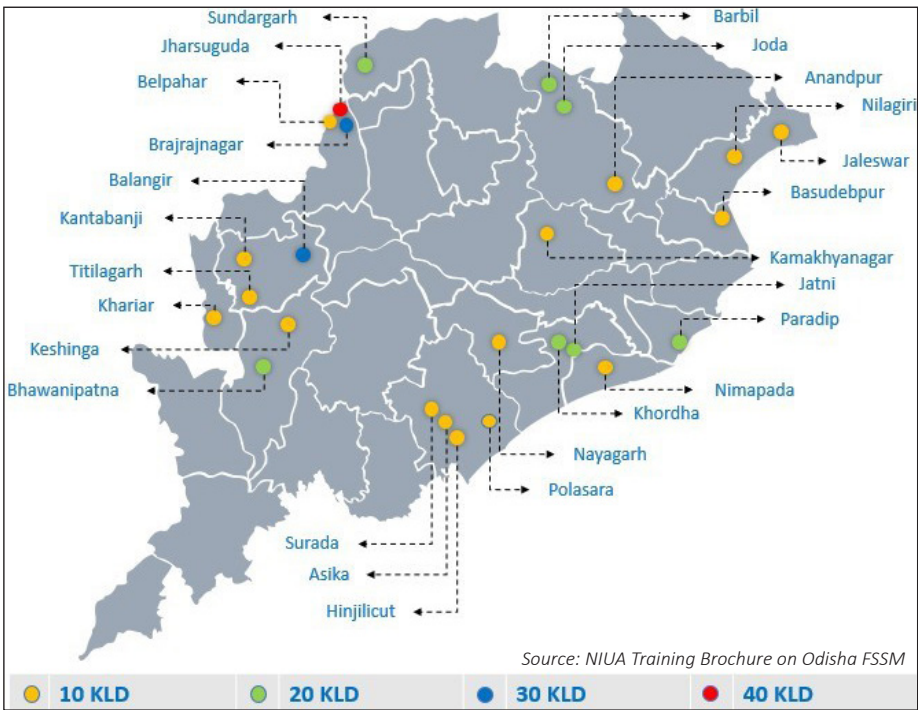
### Advantages of Non-Sewered Sanitation Systems

Some of the advantages of the Non-Sewered Sanitation Systems are as follows:

- **Low investment and operations cost:** Many small and medium towns in India cannot afford installation and maintenance of centralized STPs. The High-Powered Committee on Urban Sanitation (2011) had estimated a per capita cost of Sewage systems at Rs.4000. These being large capacity treatment plants treating Millions of Litres per Day(MLD) of sewage require a long network of underground sewers and high cost of electricity.
- **Water saving:** For an arid and semi-arid country with declining per capita water availability and expanding urban population, centralized water flow based 135LPD (Liters per person per day) water supply is not feasible.<sup>8</sup> Less than 10% of the Indian cities receive this amount<sup>9</sup>. An NSS sanitation system relies on conveyance of Septage by trucks or tractors, water for sewage flow is not required. Smaller volumes of treated water are easy to re-use or apply for recharge of ground water close to the treatment plant.
- **Lower risk of failure:** NSS systems, especially those with gravity and natural treatment solutions, are easy to monitor and fix during failures. Their electricity consumption is minimum and mechanical failures are few. NSS using mechanical and membrane based systems are more complicated than natural (DEWATS) systems, but being small, repairing and maintenance is possible with relative ease as compared to large STPs.
- **Short gestation period, few dug out roads and repairs:** Any new centralized sewage systems leads to massive digging of roads and frequent maintenance works causing massive traffic congestion.
- **Water reuse and compost:** NSS systems are smaller, decentralized in their context and location. They have a higher potential for re use of treated waste water and compost.
- **Community engagement:** The system works on scheduled and regular desludging of septic tanks and local management of decentralized waste water treatment facilities. The plant is usually accessible to people of the town, it has the potential for people to come, visit and see the operations.

Cidco@Smart Vol 5, Issue 1&2, 2019

Figure 2 – Towns in Odisha to implement FSSM plants in phase 2.



Source: NIUA Training Brochure on Odisha FSSM

The state of Odisha has taken a leading role in promoting NSS systems as a pioneer for committing to scaling up of faecal sludge and Septage management services to all the 114 Urban Local Bodies in the state.

Faecal Sludge and Septage Management Plants has already been installed and are operational in 11 towns already in phase 1 (mentioned in table 2). In smaller towns, where enough septage is not generated on a daily basis, Deep Row Entrenchment (DRE) is being implemented as a temporary measure in 84 towns of Odisha. In this method, a deep trench is dug where ground water tables are low, trucks carrying septage from septic tanks dump their load in these trenches and they are covered with soil. Over a period of time, the sludge decomposes.

Table 2: List of towns in Odisha Operating with FSSM Plants -Phase 1

Location	Capacity
Bhubaneswar	75 KLD
Cuttack	60 KLD
Balasore	60 KLD
Baripada	50 KLD
Puri	50 KLD
Rourkela	40 KLD
Berhanpur	40 KLD
Bhadrak	40 KLD
Dhenkanal	27 KLD
Sambalpur	20 KLD
Anugul	18 KLD

Odisha has shown that a combination of political and administrative will, with the active leadership of the Chief Minister and Senior most officials of Urban and Rural Ministries of the state can bring a paradigm shift away from centralized sanitation systems.

### Conclusion

The 2017 national Faecal Sludge and Septage Management Policy provides a national policy

guidance for NSS systems for India. 19 out of the 36 Indian states have adopted the FSSM Policy. 442 towns have announced or tendered the construction of FSTPs.<sup>10</sup> This includes more than a hundred towns each in Odisha, AP and Maharashtra and a significantly large number in Telangana, Tamil Nadu and Jharkhand.

A predominantly semi-arid and arid country like India cannot afford centralised urban sewage sanitation systems/STPs designed for 135 Kilo Litres a Day (KLD) household water supply, essentially to flush and flow the sewage to the treatment plant.

Even the CPHEEO Manual<sup>11</sup> in its preamble, identifies several reasons why centralized systems are inappropriate for India. The CPHEEO Manual also defines the high capital and O&M costs of centralized STPs as hurdles for small towns, “it remains a highly resource inefficient technology. Consequently, high capital cost and continuing significant costs of O&M of this system prohibit its widespread adoption in all sizes of urban areas in the country”.

NSS systems offers an alternative to address the challenge of treatment of septage and human waste. These are decentralized small-scale systems with different technology options and can be operated and run by the urban local bodies by themselves or in partnership with the private sector.

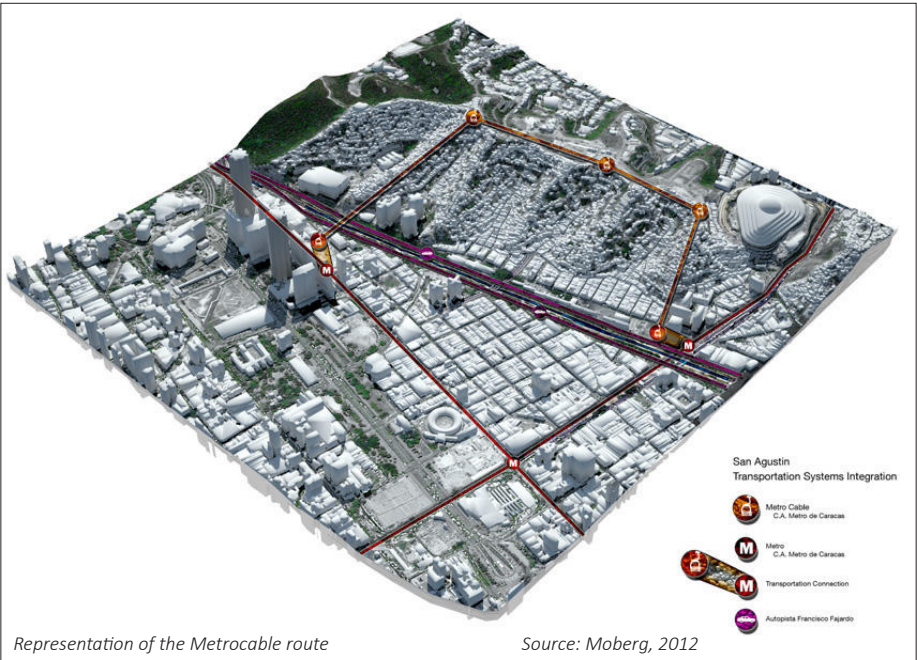
Drinking water and sanitation need to be treated as a social good and a Statutory Right, mandated by law. As more and more Indian cities grapple with water scarcity, effective regulation and law will be needed to ensure equity in supply and efficient use of available water sources of the country.

City managers and administrators need to explore options for conserving water and its re-use. Investing in small-scale decentralised and Non Sewered Sanitation Systems technologies seems the most feasible; to ensure use of minimum water for waste treatment. States like Odisha, AP and Tamil Nadu are showing us a possibility.



# Providing Accessibility to Low-Income Neighbourhoods:

## ■ Case Study of Metrocable in Caracas, Venezuela



### Introduction

Accessibility talks about the ability of connecting two places physically and socially. The translation of this definition highlights various aspects of transportation systems (Bosetti, 2018; Social Exclusion Unit, 2003):

- existence or availability
- location
- safety
- reliability
- affordability
- adequacy (for disabled people for example)

These criteria are some good indicators for accessibility, however, they are not exhaustive (Handy, 1994). Each individual have different needs and transportation systems must be adapted to the overall context of the area or region it is being implemented in.

The most vulnerable neighbourhoods like rural, peri-urban, urban peripheral, remote and deprived areas are most impacted by lack of public transportation and accessibility (Bosetti, 2018). In most cases, the lower income groups of the population are most affected by lack of accessibility, therefore, providing accessibility is a matter of equity (Venter, Mahendra, & Hidalgo, 2019). This article will discuss the case study of Caracas, Venezuela, where cable-cars link the San Agustín neighbourhood with the rest of the city. This project has a strong emphasis on the integration of the transportation system with the surrounding urban environment.

### The Metrocable Project

#### The San Agustín neighbourhood

This informal neighbourhood was built on the city's hillside without any recognition from the municipality. Lack of education, violence and other social issues conduce in the isolation of the area from the capital city (Moberg, 2012). Hosting 38,000 inhabitants, it is also one of the poorest neighbourhoods of Caracas (Caracas Alcaldía Mayor, 2006), a city where social segregation through income level is integral (Lizarraga, 2012) at the same time, unequal conditions related to urban mobility and accessibility. Deregulation and privatization of the collective transport induced the emergence of a disorganized and disarticulated sector. As this "rancho" was not indicated on the city's official maps (Moberg, 2012), no transportation system was provided either. Uncoordinated and expensive private operators forced the inhabitants to either walk or restrain their mobility (Lizarraga, 2012)

#### Commencement

The municipality of Caracas decided to build a new highway crossing the heart of the neighbourhood and destroying many places of habitat. At this instance, in July 2003, Urban Think Tank, an architectural agency, protested against this project (Urban Think Tank, 2011b) and the coordination between architects, planners, experts and locals brought cable car system as the best solution to serve the area (Urban Think Tank, 2011a). The major asset of cable-cars is that its construction is not as intrusive as other modes of transport. Only a few dwellings were destroyed during the construction of the project. Those destroyed



Plan of La Ceiba station

were relocated in households integrated to the infrastructure. The stations' designs were also subject to concertation with inhabitants, each building was studied to fit the needs of the locals (Urban Think Tank, 2011a).

#### Implementation

The line, inaugurated in 2010, has 5 stations across San Agustín, and is connected to Caracas' metro line. It has a capacity of 1200 persons per hour in both directions (Sokol, 2010). The cable car system enables to cross two physical obstacles: the hill, and the highway, both cutting the neighbourhood from the rest of Caracas and its transportation systems.

### Impacts on Accessibility and Quality of Life

#### Accessibility

Before the implementation, inhabitants mainly commuted on foot (Caracas Alcaldía Mayor, 2006). In average, they would walk the equivalent of climbing 39 floors a day only to reach the transportation systems (Moberg, 2012). After the implementation, the metro can be reached within 10 minutes from the highest cable-car station. Inhabitants become connected to a 54km network of rapid and reliable transport system. Metro, buses and Metrocable are managed by the same authority, Metro de Caracas, and are under the same tariff system. Inhabitants of San Agustín, through the Metrocable, now have access to healthcare, education and public transportation (Moberg, 2012).



of the Metrocable (Moberg, 2012). These services have been determined in cooperation with the inhabitants and respond to local needs, for example:

- *Station Hornos de Cal*: contains a school, a schoolyard and a healthcare centre.
- *Station La Ceiba*: provides numerous facilities like police station, library, information centre and supermarket. An additional sports ground in the station is linked with the surrounding gymnasium.
- *Station El Manguito*: the construction of the station integrated households through the 'substitución ranch por casa' programme. Destroyed shacks were replaced by secure social housing structures connected with technical and hygienic facilities (Urban Think Tank, 2011b).

As the Metrocable transport system creates mobility, The new facilities integrated to the project limit the need of mobility, points of interest are brought closer and reduce the need to travel.

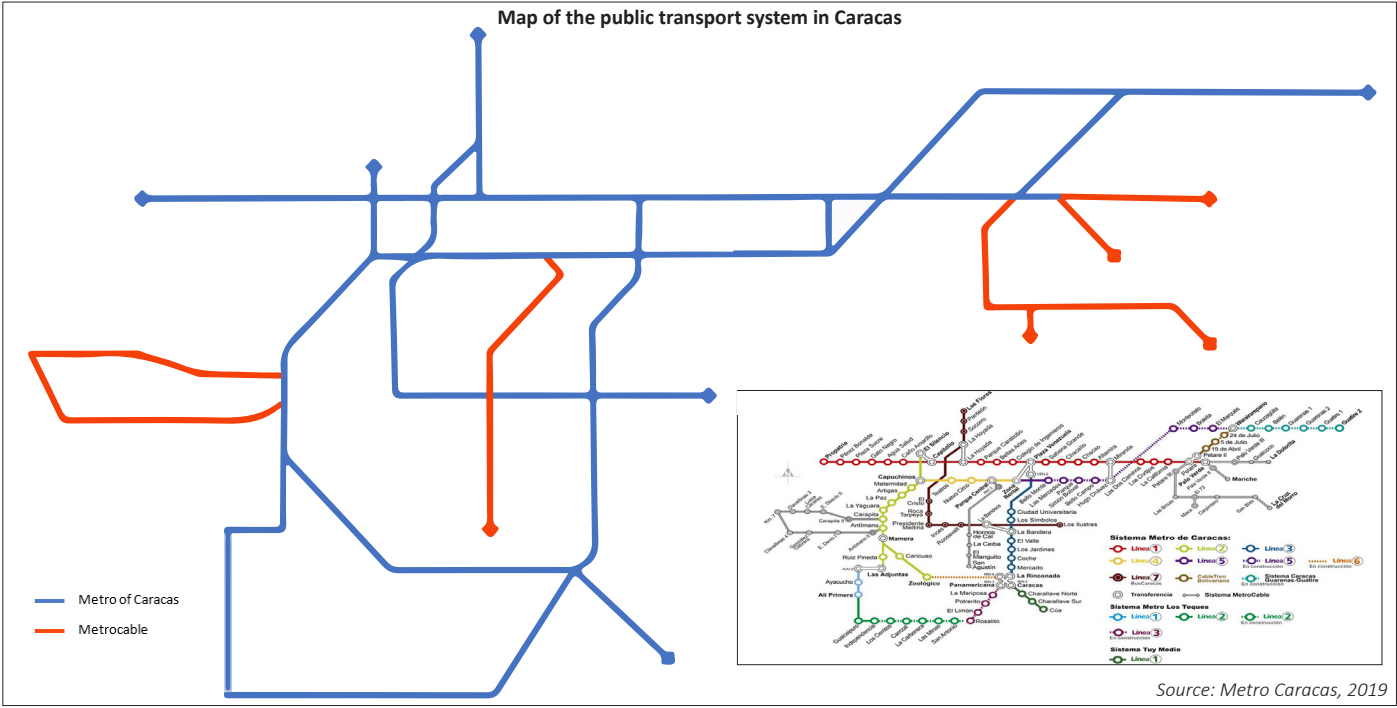
The infrastructure has other positive effects on the life in the neighbourhood. According to the project's architect Alfredo Brillembourg, "Residents have begun using the station roofs to advertise their businesses and crime rates have

dropped relatively because of the higher visibility of the Gandolas" (Sokol, 2010). The Metrocable has now become a part of the district and its identity.

### Conclusion

The project is inspired by the pioneer project of the cable car in Medellin, Colombia. This one is effective in its own ways mainly because it managed to link an isolated neighbourhood with the city (Bocarejo et al., 2014). It inspired many other cable car projects, like in Rio de Janeiro, Brazil. However, the Brazilian project is a considered a failure because it was settled too rapidly previsionsing the Olympic Games and the inhabitants were not associated with the project. Currently, the infrastructure is not used as it should be and doesn't serve the needs of the locals (Broudehoux & Legroux, 2019).

The strength of the Metrocable in Caracas is its integration with the rest of the neighbourhood. The infrastructure provides accessibility to the rest of the city for the locals, but also contributes in enhancing the quality of life. After its first implementation in 2010, three other cable car lines followed, allowing the neighbourhoods of Caracas to be more integrated and interconnected.





# BIBLIOGRAPHY

INTRODUCTION
Batty, M. (2007). Cities and complexity. Cambridge, Mass.: MIT Press.
Bettancourt, L., & West, G. (2010). A Unified Theory of Urban Living. Science and the City, 467(912-3).
Grimm, N.B., Faeth S.H., Golubiewski, N.E., Redman, C.L., Wu J., Bai, X. & J.M. Briggs (2008). Global Change and the Ecology of the Cities. Science. 319(5864)
Jacobs, J. (1961). The death and Life of Great American Cities. New York: Random House.
Macphearson, T., Pickett, S.T.A., Grimm, N.B, Niemela, J., Alberti, M., Elmqvist, T., Weber, C., Haase, D., Breuste, J., & Qureshi, S. (2016). Advancing Urban Ecology Towards a Science of Cities. Bioscience. 66 (3).
Scott, A. (2012). A world in emergence: Cities and regions in the 21st Century. Edward Elgar.
UNDESA. (2012). Challenges and way forward in the urban sector Sustainable Development in the 21st century (SD21). United Nations Department of Economic and Social Affairs (UNDESA). Retrieved from <a href="https://sustainabledevelopment.un.org/content/documents/challenges_and_way_forward_in_the_urban_sector_web.pdf">https://sustainabledevelopment.un.org/content/documents/challenges_and_way_forward_in_the_urban_sector_web.pdf</a>
UN-Habitat. (2013). State of the world’s cities 2012/2013: Prosperity of Cities. London: Routledge on behalf of UN-Habitat.
INDICATORS FOR A SLUM REDEVELOPMENT PROGRAM
Arias-Granada, Y., Haque, S. S., Joseph, G., & Yanez-Pagans, M. (2018). Water and Sanitation in Dhaka Slums. Access, Quality, and Informality in Service Provision. In Water Global Practice. Retrieved from <a href="http://www.worldbank.org/research">http://www.worldbank.org/research</a> .
Asian Development Bank. (2002). RAINWATER HARVESTING AND SLUM DEVELOPMENT in Rajasthan. In Asian Development Bank.
Betancur, J. J. (2007). APPROACHES TO THE REGULARIZATION OF INFORMAL SETTLEMENTS : THE CASE OF PRIMED IN MEDELLIN , COLOMBIA. Global Urban Development, 3(1), 1–3.
Cavalheiro, D. de C., & Abiko, A. (2015). Evaluating slum (favela) resettlements: The case of the Serra do Mar Project, São Paulo, Brazil. Habitat International, 49, 340–348. <a href="https://doi.org/10.1016/j.habitatint.2015.05.014">https://doi.org/10.1016/j.habitatint.2015.05.014</a>
Centre on Housing Rights and Evictions. (2009). Global Forced Evictions Survey- 2007-2008. In Centre on Housing Rights and Evictions (Vol. 6). Retrieved from <a href="http://eau.sagepub.com/content/6/1/131.full.pdf">http://eau.sagepub.com/content/6/1/131.full.pdf</a>
Cities Alliance. (2013). Cities alliance for cities without slum: action plan for moving slum upgrading to scale. In Special Summary Edition.
De Soto, H. (2003). The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else.
Fernandes, E. (2011). Regularization of informal settlements in Latin America.
Fiori, J., Riley, E., & Ramirez, R. (2000). Urban Poverty Alleviation Through Environmental Upgrading in Rio de Janeiro: Favela Bairro (Vol. 44). Retrieved from <a href="http://discovery.ucl.ac.uk/39452/">http://discovery.ucl.ac.uk/39452/</a>
Global Land Tool Network. (2010). Tackling tenure security in slums through participatory enumerations. In Global Land Tool Network.
Global Land Tool Network. (2018). Access to Land and Tenure Security. Retrieved from <a href="http://glt.n.net/access-to-land-and-tenure-security/#">http://glt.n.net/access-to-land-and-tenure-security/#</a>
Goytia, C., & Dorna, G. (2019). Doing Bad by Doing Good ? An Empirical Analysis of the Incentives from Informal Settlements ’ Upgrading Programs on Urban Informality.
Hindman, M., Lu-Hill, O., Murphy, S., Rao, S., Shah, Y., & Zhu, Z. (2015). Dow Sustainability Fellowship 2015: Addressing Slum Redevelopment Issues in India.
Holland, A. (2006). Venezuela’s Urban Land Committees and Participatory Democracy. Retrieved from Venezuelanalysis website: <a href="https://venezuelanalysis.com/analysis/1611">https://venezuelanalysis.com/analysis/1611</a>
Juliman, D. (2006). The world’ s first slum upgrading programme. World Urban Forum III Sustainable Cities-Turning Ideas into Action. Retrieved from <a href="http://mirror.unhabitat.org/cdrom/docs/WUF7.pdf%0Awww.unhabitat.org">http://mirror.unhabitat.org/cdrom/docs/WUF7.pdf%0Awww.unhabitat.org</a>
Maher, S. (2017). Dealing with slums in Egypt: Learning from the success factors of international experiences. Retrieved from <a href="http://dar.aucegypt.edu/handle/10526/5021">http://dar.aucegypt.edu/handle/10526/5021</a>
Menshaw, A. El, Shafik, S., & khedr, F. (2016). Affordable Housing as a Method for Informal Settlements Sustainable Upgrading. Procedia- Social and Behavioral Sciences, 223, 126–133. <a href="https://doi.org/10.1016/j.sbspro.2016.05.330">https://doi.org/10.1016/j.sbspro.2016.05.330</a>
Meredith, T., & MacDonald, M. (2017). Community-supported slum-upgrading: Innovations from Kibera, Nairobi, Kenya. Habitat International, 60, 1–9. <a href="https://doi.org/10.1016/j.habitatint.2016.12.003">https://doi.org/10.1016/j.habitatint.2016.12.003</a>
Minnery, J., Argo, T., Winarso, H., Hau, D., Veneracion, C. C., Forbes, D., & Childs, I. (2013). Slum upgrading and urban governance: Case studies in three South East Asian cities. Habitat International, 39, 162–169. <a href="https://doi.org/10.1016/j.habitatint.2012.12.002">https://doi.org/10.1016/j.habitatint.2012.12.002</a>
Nassar, D. M., & Elsayed, H. G. (2018). From Informal Settlements to sustainable communities. Alexandria Engineering Journal, 57(4), 2367–2376. <a href="https://doi.org/10.1016/j.aej.2017.09.004">https://doi.org/10.1016/j.aej.2017.09.004</a>
Patel, S., Sliuzas, R., & Mathur, N. (2015). The risk of impoverishment in urban development-induced displacement and resettlement in Ahmedabad. Environment and Urbanization, 27(1), 231–256. <a href="https://doi.org/10.1177/0956247815569128">https://doi.org/10.1177/0956247815569128</a>
Sheth, A. Z., Velega, N. R., & Price, A. D. F. (2009). Slum rehabilitation in the context of urban sustainability : a case study of Mumbai , India. 2nd International Conference on Whole Life Urban Sustainability and Its Assessment. Loughborough University.
Sunikka-Blank, M., Bardhan, R., & Haque, A. N. (2019). Gender, domestic energy and design of inclusive low-income habitats: A case of slum rehabilitation housing in Mumbai, India. Energy Research and Social Science, 49(November 2018), 53–67. <a href="https://doi.org/10.1016/j.erss.2018.10.020">https://doi.org/10.1016/j.erss.2018.10.020</a>
Syagga, P. ul, Syagga, P., Tenure, L., Projects, U., Est, D., & Nairobi, I. (2012). Land Tenure in Slum Upgrading Projects. Les Cahiers d’Afrique de l’Est, IFRA NAirobi, 103–113.

UN-HABITAT. (n.d.). Housing and slum upgrading. Retrieved from <a href="https://unhabitat.org/urban-themes/housing-slum-upgrading/">https://unhabitat.org/urban-themes/housing-slum-upgrading/</a>
UN-HABITAT. (2009). The UN-HABITAT Slum Upgrading Facility Newsletter. (April).
UN-HABITAT. (2011). Building Urban Safety through Slum Upgrading. In Assessment.
UN-HABITAT. (2012). State of the World’s Cities Report. Retrieved from <a href="http://www.unhabitat.org">www.unhabitat.org</a>
UN-HABITAT. (2014). Streets as tools for urban transformation in slums.

## SELF-ORGANISATION IN AMSTERDAM: CASE-STUDY OF OOSTENBURG

Boonstra, Beitske, & Boelens, L. (2011). Self-organisation in urban development, towards a new perspective on spatial planning. (Rob Atkinson, Ed.) URBAN RESEARCH & PRACTICE, 4(2), 99–122.
Broekmans, T., Feenstra, S., Urhahn, G., Edens, C., & Nolan, B. (2012). The spontaneous city. Amsterdam: BIS Publishers.
Byrne, D. (2003). Complexity theory and planning theory: a necessary encounter. Planning Theory, 2(3): 171-178.
Clarke, P. and Harvey, D. (1991). The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change. Journal of Architectural Education (1984-), 44(3), p.182
De Roo, G., Hillier, J. & Van Wezemael, J.E. (eds.) (2012), Complexity and Planning – Systems, Assemblages and Simulations, Farnham England, Burlington USA, Ashgate
Edwin Buitelaar, Maaïke Galle, Niels Sorel (2014). The Public Planning of Private Planning: An analysis of controlled spontaneity in the Netherlands. Cities and Private planning: Edward Elgar, 2014: 248-267.
Florida, R. (2005). Cities and the creative class. New York, NY [u.a.]: Routledge.
Jacobs, J.M. (1961) The death and life of great American cities. New York: Random House (NY).
Landa da, M., (2000), A Thousand Years of Nonlinear History, The MIT Press.
Musterd, S., van Gent, W., Das, M. and Latten, J. (2014). Adaptive behaviour in urban space: Residential mobility in response to social distance. Urban Studies, 53(2), pp.227-246.
Portugali, J., Haken, H., Benenson, I., Omer, I., Alfasi, N. and Haken, H. (2000) Self-organization and the city. Berlin: Springer-Verlag Berlin and Heidelberg GmbH & Co. K.
Rauws, W. (2017). Embracing Uncertainty Without Abandoning Planning. disP- The Planning Review, 53(1), pp.32-45.
Rauws, W. and Roo, G. (2015). Why planning needs complexity. 1st ed. [Groningen]: Rijksuniversiteit Groningen.
Rauws, W. S. & De Roo G. (2011). Exploring transitions in the peri-urban area. Planning Theory and Practice, 12:269–284.
Remøy, H., Koppels, P. W., van Oel, C. & de Jonge, H. (2007) Characteristics of vacant offices: A Delphi-approach. enhr Rotterdam 2007. Rotterdam.
Salet, W., Bertolini, L., & Giezen, M. (2013). Complexity and Uncertainty: Problem or Asset in Decision Making of Mega Infrastructure Projects? International Journal
Savini F. (2017). Deconstructing urbanity and disaggregating the city-region: the effects of self-organization in Amsterdam. International Journal of Urban and Regional Research. Volume 40, Issue 6. 1152–1169
Scott, A. (2012). A World of Emergence: Cities and Regions in the 21st Century. Northampton: Edward Elgar.
Stadgenoot, (2013). [online] Available at: <a href="http://www.oostenburg.nl/wp-content/themes/oostenburg/img/downloads/201611/bestemminsplan-toelichting.pdf">http://www.oostenburg.nl/wp-content/themes/oostenburg/img/downloads/201611/bestemminsplan-toelichting.pdf</a> [Accessed 20 Apr. 2017].
Tan, E., Bekkering, H.C. and Reijndorp, A. (2014) Negotiation and design for the self-organizing city: Gaming as a method for urban design. TU Delft, Faculteit Bouwkunde, Afdeling Real Estate and Housing.
Uitermark, J. (2015). Longing for Wikitopia: The study and politics of self-organisation. Urban Studies, 52(13), pp.2301-2312
UNDP. (2016). Citizen Engagement in Public Service Delivery- The critical role of public officials. Singapore: UNDP
Urhahn Urban Design (2010). The spontaneous city. Amsterdam, BIS Publishers
WRR, Wetenschappelijke Raad voor Regeringsbeleid (2008). Innovatie Vernieuwd: Opening inviervoud. Den Haag. Wetenschappelijke Raad voor Regeringsbeleid

## URBAN HEAT ISLAND EFFECT: CAUSES AND REMEDIES

EPA, U. (2008). Reducing Urban Heat Islands: Compendium of Strategies. Washington D.C.: U.S. EPA.
TERI. (2017). Urban Planning Characterstics to Mitigate Climate Change in Context of Urban Heat Island Effect. Bangalore: TERI.
Ningrum, W. (2018). Urban Heat Island towards Urban Climate. Earth and Environmental Science, 7.
Yang, L. (2016). Research on Urban Heat Island Effect. Science Direct, 8.
Miner, M. J. (2017). Efficiency, Economics and the Urban Heat Island. Environment and Urbanization, 12.
Osmond, P. (2017). Guide to Urban Cooling Strategies. Australia: Low Carbon Living.
Akbari, H. (2016). Local climate change and urban heat island mitigation techniques- the state of the art. Journal of civil engineering and management, 16.
Parvantis, J., Stigka, E., Fotiadi, A., & Mihalakakou, G. (2015). Urban heat island intensity: A literature review. Fresenius Environmental Bulletin, 24(12b).
Sharifi, E., & Lehmann, S. (2014). Comparative Analysis of Surface Urban Heat Island Effect in Central Sydney. Journal of Sustainable Development, 23-34.
Argüeso, D., Evans, J., Fita, L., & Bormann, K. (2014). Temperature response to future urbanization and climate change. Climate Dynamics, 2183-2199.

## TOWARDS BETTER AIR QUALITY: CASE STUDY OF LONDON’S LEZ

ADEME. (2017). Zones à faibles émissions (Low Emission ZONes) à travers l’Europe.
---



AEA Technology Environment. (2003). The London Low Emission Zone Feasibility Study.

Ellison, R. B., Greaves, S. P., & Hensher, D. A. (2013). Five years of London ’ s low emission zone : Effects on vehicle fleet composition and air quality. Transportation Research Part D, 23, 25–33. <https://doi.org/10.1016/j.trd.2013.03.010>

European Commission. (2017). Review of the EU Air policy. Retrieved from [http://ec.europa.eu/environment/air/clean\\_air/review.htm](http://ec.europa.eu/environment/air/clean_air/review.htm)

Greater London Authority. (2017). London Environment Strategy.

Greater London Authority. (2019). The Mayor’s Ultra Low Emission Zone for London. Retrieved from <https://www.london.gov.uk/what-we-do/environment/pollution-and-air-quality/mayors-ultra-low-emission-zone-london>

Johnson, L., & Potter, S. (2008). Air Quality Action Plan Progress Report 2008 / 09 London Borough of Croydon.

Kelly, F., Armstrong, B., Atkinson, R., Anderson, H. R., Barratt, B., & Beevers, S. (2011). The London Low Emission Zones Baseline Study.

Scott Wilson. (2006). Strategic Environmental Assessment of the Proposed Revisions to the Mayor’s Transport Strategy and the Mayor’s Air Quality Strategy to Introduce a Low Emission Zone.

Transport for London. (2008). London Low Emission Zone: Impacts Monitoring.

Transport for London. (2010). Transport for London Congestion Charge.

UNECE. (2018). Clean Air. Retrieved from <https://www.unece.org/env/lrtap/welcome.html.html>

Walton, B. H., Dajnak, D., Beevers, S., Williams, M., Watkiss, P., & Hunt, A. (2015). Understanding the Health Impacts of Air Pollution in London.

WHO. (n.d.). Ambient air pollution: Health impacts.

Wood, H. E., Marlin, N., Mudway, I. S., Brenner, S. A., Cross, L., Dundas, I., ... Griffiths, C. J. (2015). Effects of Air Pollution and the Introduction of the London Low Emission Zone on the Prevalence of Respiratory and Allergic Symptoms in Schoolchildren in East London : A Sequential Cross-Sectional Study. PLoS ONE, 1–12. <https://doi.org/10.1371/journal.pone.0109121>

URBAN FOOD SYSTEMS: CASE STUDY OF BALTIMORE FOOD POLICY INITIATIVE

BFPI. (2015). Baltimore Food Policy Initiative: 2015 Food Environment Map.

Biehl, E., Huang, A., Chodur, G., Hopkins Bloomberg School of Public Health, J., Neff, R., Baja, K., ... Hopkins Bloomberg, J. (2017). Baltimore Food System Resilience Advisory Report. Retrieved from <http://health.baltimorecity.gov/emergency-preparedness-response/september-national-pre->

Block, D., & Kouba, J. (2007). A comparison of the availability and affordability of a market basket in two communities in the Chicago area. Public Health Nutrition. <https://doi.org/https://doi.org/10.1017/PHN2005924>

Breyer, B., & Voss-Andreae, A. (2013). Food mirages: Geographic and economic barriers to healthful food access in Portland, Oregon. Health & Place. <https://doi.org/https://doi.org/10.1016/j.healthplace.2013.07.008>

Butler, P. (2018). More than a million UK residents live in “food deserts”, says study. The Guardian. Retrieved from <https://www.theguardian.com/society/2018/oct/12/more-than-a-million-uk-residents-live-in-food-deserts-says-study>

City of Baltimore. (2018). Baltimore Food Policy Initiative.

Cummins, S., & Macintyre, S. (2002). “Food deserts”—evidence and assumption in health policy making. BMJ (Clinical Research Ed.), 325(7361), 436–438. <https://doi.org/10.1136/bmj.325.7361.436>

Feeding America. (2019). Food Insecurity in The United States. Retrieved from <https://map.feedingamerica.org/>

Furey, S., Strugnell, C., & McIlveen, H. (2001). An investigation of the potential existence of “food deserts” in rural and urban areas of Northern Ireland. Agriculture and Human Values, 18(4), 447–457. <https://doi.org/10.1023/A:1015218502547>

Hendrickson, D., Smith, C., & Eikenberry, N. (2006). Fruit and vegetable access in four low-income food deserts communities in Minnesota. Agriculture and Human Values, 23(3), 371–383. <https://doi.org/10.1007/s10460-006-9002-8>

Laska, M. N., Borradaile, K. E., Tester, J., Foster, G. D., & Gittelsohn, J. (2009). Healthy food availability in small urban food stores: a comparison of four US cities. Public Health Nutrition. <https://doi.org/https://doi.org/10.1017/S1368980009992771>

Mancino, L., Guthrie, J., & Just, D. R. (2018). Overview: Exploring ways to encourage healthier food purchases by low-income consumers—Lessons from behavioral economics and marketing. Food Policy, 79(February), 297–299. <https://doi.org/10.1016/j.foodpol.2018.03.007>

Misiaszek, C., Buzogany, S., & Freishtat, H. (2018). Baltimore City 2018 Food Environment Brief. Retrieved from [https://planning.baltimorecity.gov/sites/default/files/City Map Brief 011218.pdf](https://planning.baltimorecity.gov/sites/default/files/City%20Map%20Brief%2011218.pdf)

Moore, L. V., Diez Roux, A. V., Nettleton, J. A., & Jacobs, D. R. (2008). Associations of the local food environment with diet quality- A comparison of assessments based on surveys and geographic information systems. American Journal of Epidemiology, 167(8), 917–924. <https://doi.org/10.1093/aje/kwm394>

Mykerezzi, E., & Mills, B. (2010). The Impact of Food Stamp Program Participation on Household Food Insecurity. American Journal of Agricultural Economics. <https://doi.org/https://doi.org/10.1093/ajae/aaq072>

Pothukuchi, K., & Kaufman, J. L. (2000). The food system: A stranger to the planning field. Journal of the American Planning Association, 66(2), 113–124. <https://doi.org/10.1080/01944360008976093>

Rose, D., & Richards, R. (2007). Food store access and household fruit and vegetable use among participants in the US Food Stamp Program. Public Health Nutrition. <https://doi.org/https://doi.org/10.1079/PHN2004648>

Santo, R., Yong, R., & Palmer, A. (2014). Collaboration Meets Opportunity: The Baltimore Food Policy Initiative. Journal of Agriculture, Food Systems, and Community Development, 4(3), 193–208. <https://doi.org/10.5304/jafscd.2014.043.12>

Swartz, H., Santo, R., & A. Neff, R. (2018). Promoting Sustainable Food System Change Amidst Inequity: A Case Study of Baltimore, Maryland. Advances in Food Security and Sustainability, 135–176. <https://doi.org/10.1016/bs.af2s.2018.09.006>

USDA. (2018). Food Security in th U.S. Retrieved from <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us.aspx>

Ver Ploeg, M., & Wilde, P. E. (2018). How do food retail choices vary within and between food retail environments? Food Policy, 79(58), 300–308. <https://doi.org/10.1016/j.foodpol.2018.03.005>

Walker, R. E., Keane, C. R., & Burke, J. G. (2010). Disparities and access to healthy food in the United States: A review of food deserts literature. Health and Place, 16(5), 876–884. <https://doi.org/10.1016/j.healthplace.2010.04.013>

IMPACT OF URBAN MORPHOLOGY ON SOCIAL LIFE: CASE-STUDY OF LA DUCHÈRE, LYON

Allain, R. (2014). Morphologie urbaine. Paris: A. Colin.

Bachelet, M., Bres, C., Djirikian, A., & Lot, L. (2006). Historique de la construction du logement social de 1954 à 1973 [Ebook] (p. 104). Paris: DRAC IDF. Retrieved from [http://alexandredjirikian.free.fr/DRAC\\_IDF\\_-\\_Historique\\_logt\\_social\\_1953\\_1974.pdf](http://alexandredjirikian.free.fr/DRAC_IDF_-_Historique_logt_social_1953_1974.pdf)

Congress for the New Urbanism. (2001). Charter of the new urbanism [Ebook]. Retrieved from [https://www.cnu.org/sites/default/files/charter\\_english.pdf](https://www.cnu.org/sites/default/files/charter_english.pdf)

Dagues, C. (2019). La Duchère [Video]. Office national de radiodiffusion télévision française.

Fang, Z., James Floyd, T., Marrielle, D., Joy, C. and Marketa, J. (2017). Urban food systems diagnostic and metrics framework. [online] The World Bank. Available at: <http://documents.worldbank.org/curated/en/807971522102099658/pdf/Final-report-Urban-Food-Systems-Diagnostic-and-Metrics-Framework.pdf> [Accessed 8 Jun. 2019].

Fourcaut, A. (2010). Les grands ensembles, symbole de la crise urbaine ?. In D. Mei & H. Tertrais, Temps croisés (1st ed., pp. 197-209). Paris: Edition de la maison des sciences de l’homme.

GPV La Duchère. (2018). Un grand Projet pour faire de La Duchère un quartier durable.

Grafmeyer, Y. (1998). Logement, quartier, sociabilité. In M. Segaud, C. Bonvalet & J. Brun, Logement et habitat. L’état des savoirs (pp. 409-417). La Découverte.

Hersemul, B. (2016). L’occupation et l’appropriation des espaces publics dans les grands ensembles : l’étude du quartier des Comtes à Port-de-Bouc. Aix Marseille Université.

Madanipour, A. (2015). Public and Private Spaces of the City.

Mouratidis, K. (2018). Built environment and social well-being: How does urban form affect social life and personal relationships?. Cities, (74), 7-20.

Tchernia, P. (1960). Quarante mille voisins [Video].

Urban Task Force. (1999). Toward an urban renaissance (pp. 2-70).

URBAN SANITATION AND WASTE WATER CHALLENGE OF INDIA: IMPERATIVE OF WATER DEMAND MANAGEMENT AND NON-SEWERED SANITATION SYSTEMS

1. <http://www.tnuscbe.org/download/go/go345.pdf>
2. [https://www.bwssb.gov.in/images/upload/pdfs/STP\\_Final\\_Notification\\_on\\_21\\_2\\_2018\\_4A.pdf](https://www.bwssb.gov.in/images/upload/pdfs/STP_Final_Notification_on_21_2_2018_4A.pdf)
3. [https://www.business-standard.com/article/current-affairs/jal-shakti-ministry-to-adopt-a-flexible-approach-for-tackling-water-issue-119061101434\\_1.html](https://www.business-standard.com/article/current-affairs/jal-shakti-ministry-to-adopt-a-flexible-approach-for-tackling-water-issue-119061101434_1.html)
4. <http://www.worldbank.org/en/news/feature/2017/05/15/water-scarce-cities-initiative>
5. <http://www.iwmi.cgiar.org/2014/08/water-demand-projections-off-need-more-local-insight/>
6. <https://www.indiatoday.in/india/story/why-india-does-not-have-enough-water-to-drink-1557669-2019-06-28>
7. <https://issuu.com/undp/docs/grd-volume-2>
8. All sewerage systems of STPs are designed with the norm of 135 liters per person day supply, as per CPHEEO norms.
9. PAS data base, CEPT University
10. Source: NFSSM Alliance assessment based on commitments by at least 10 states as on end of 2018
11. CPHEEO. (2013). Manual on Sewerage and Sewage Treatment Systems- 2013. Ministry of Urban Development (MoUD).

PROVIDING ACCESSIBILITY TO LOW-INCOME NEIGHBOURHOODS:- CASE STUDY OF METROCABLE IN CARACAS, VENEZUELA

An innovative transit system and its impact on low income users: The case of the Metrocable in Medellín. Journal of Transport Geography, 39, 49–61. <https://doi.org/10.1016/j.jtrangeo.2014.06.018>

Bosetti, S. (2018). New mobility approaches to fight transport poverty and improve accessibility in european cities and regions. (September).

Broudehoux, A., & Legroux, J. (2019). L’option téléphérique dans les favelas de Rio de Janeiro- Conflits d’intérêts entre méga-événements , tourisme et besoins locaux.

Caracas Alcaldia Mayor. (2006). Estudio de movilidad en el distrito metropolitano de Caracas.

Handy, S. (1994). Highway Blues: Nothing a Little Accessibility Can’t Cure. Access, 5, 1–9.

Lizarraga, C. (2012). Expansión metropolitana y movilidad: El caso de Caracas. Eure, 38(113), 99–125. <https://doi.org/10.4067/S0250-71612012000100005>

Moberg, M. (2012). INTEGRATING POLITICS AND PLANNING : from the Swedish housing program to Caracas Metro Cable.

Social Exclusion Unit. (2003). Making the Connections: Final Report on Transport and Social Exclusion. <https://doi.org/10.4324/9781315249971>

Sokol, D. (2010). Over Site: how Caracas’s new cable-car system is making the city’s favelas more visible. Architonic. Retrieved from <https://www.architonic.com/en/story/david-sokol-over-site-how-caracas-s-new-cable-car-system-is-making-the-city-s-favelas-more-visible/7000511>

Urban Think Tank. (2011a). Metro Cable Caracas. Plataforma Arquitectura. Retrieved from <https://www.plataformaarquitectura.cl/cl/02-96696/metro-cable-caracas-urban-think-tank>

Urban Think Tank. (2011b). Metro Cable Project. Urban Matters. Retrieved from <http://urban-matters.org/projectsbyindividuals/metro-cable-project>

Venter, C., Mahendra, A., & Hidalgo, D. (2019). From Mobility to Access for All: Expanding Urban Transportation Choices in the Global South. Retrieved from [www.citiesforall.org](http://www.citiesforall.org).