Zu heiß oder zu kalt –

Vergleichende Studien zu Energiearmut und thermischem Komfort in Indien und Österreich

Dr. Tania Berger

Social sPACe based research in built Environment (SPACE)

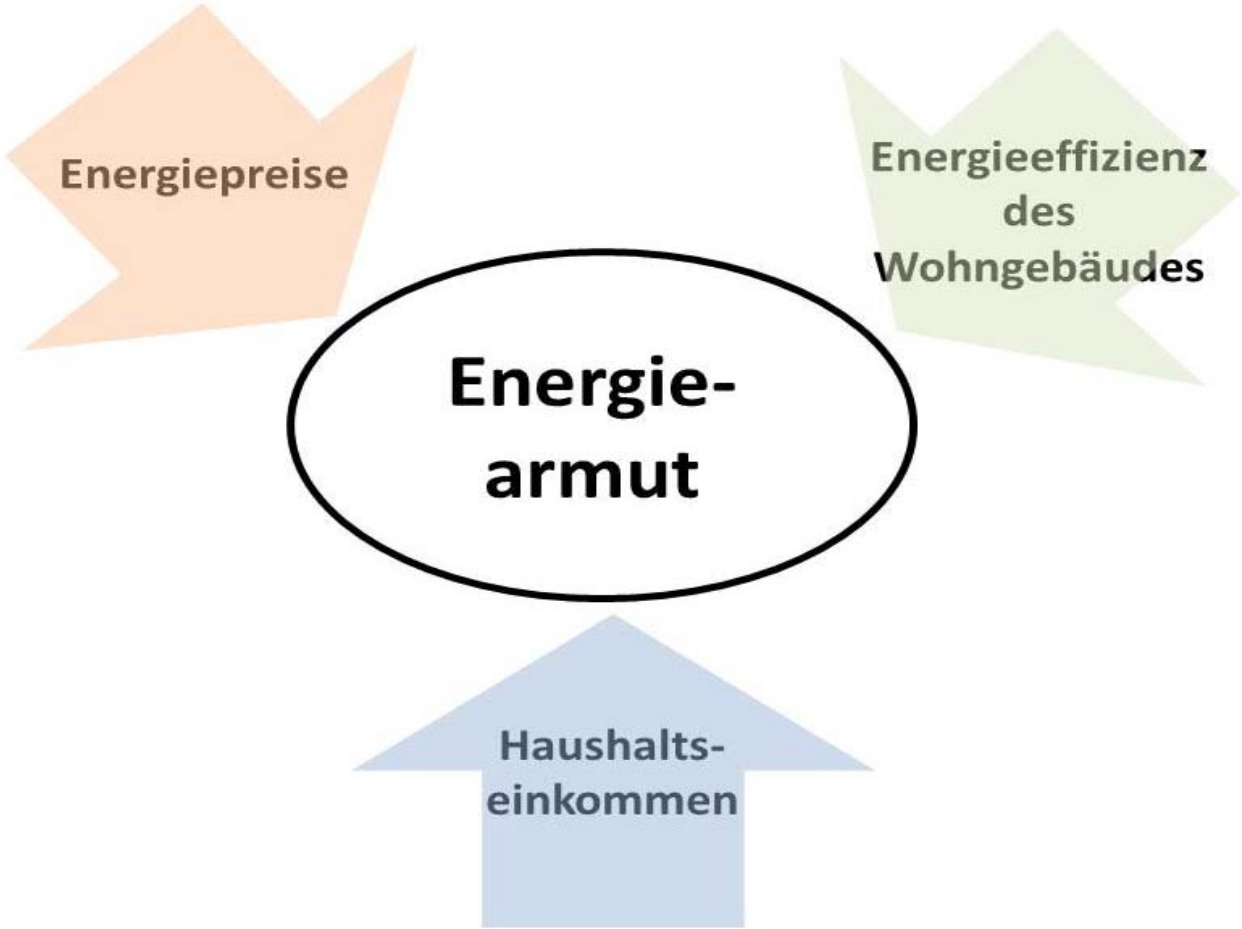
Was ein Lokalpolitiker im Verlaufe des Forschungsporjektes über Energiearmut lernte:

Beim ersten Treffen mit den ForscherInnen:

Zu Projektstart:

Bei der Schlusspräsentation

Drei wesentliche Einflussfaktoren für Energiearmut



Energiearmut & Gesundheit

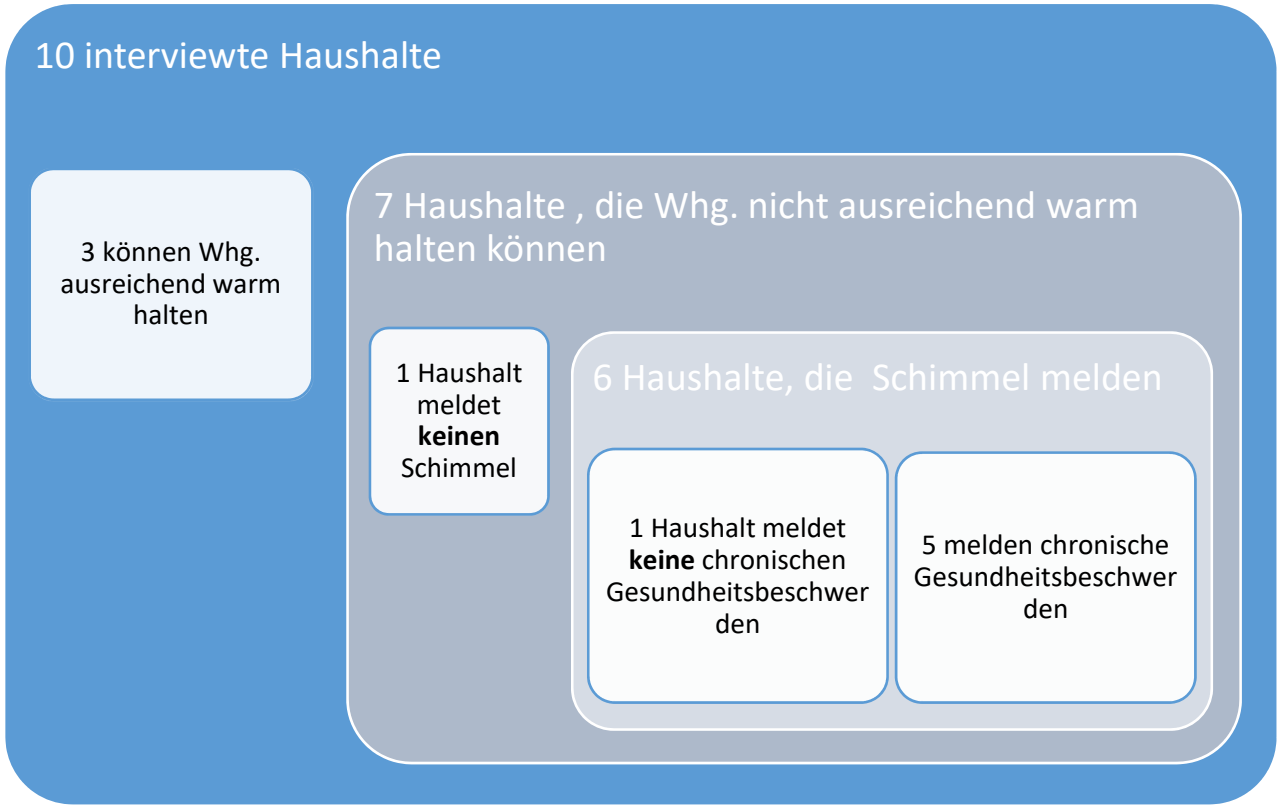
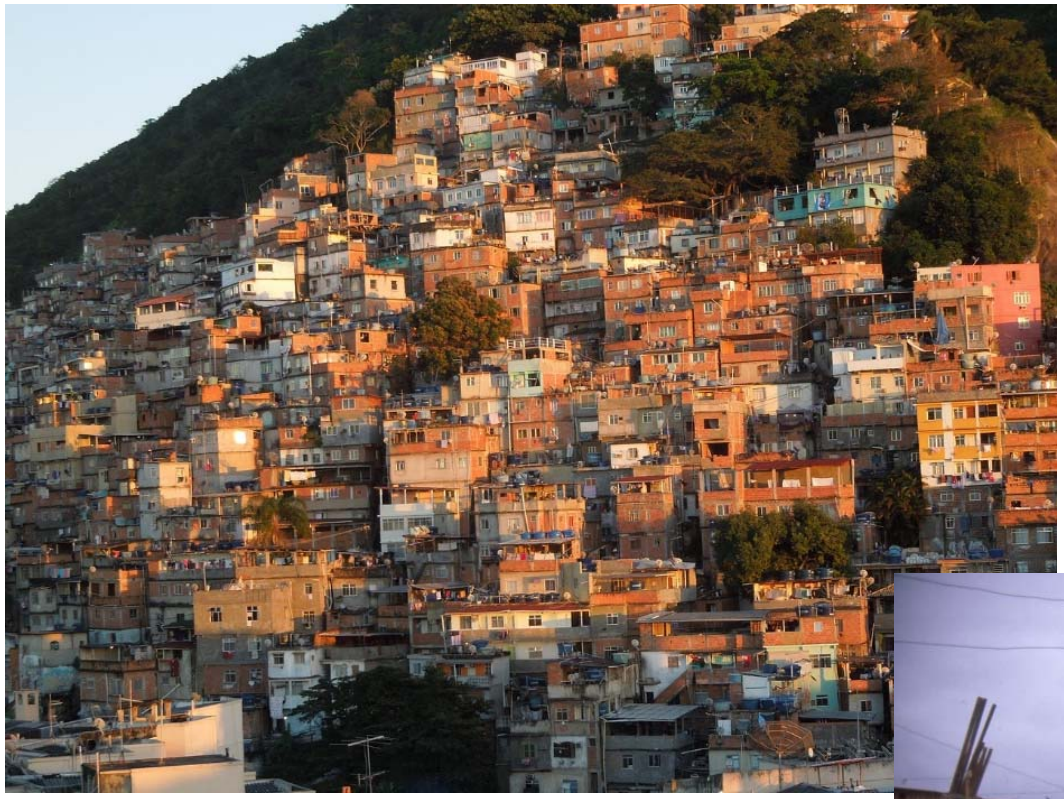


Figure: **Usage of benefits of increased energy efficiency after building refurbishment**

literature source	reduction in energy consumption					increased thermal indoor comfort (warmth)					comment
	%										
	10	20	30	40	50	60	70	80	90	100	
Skumatz (1996)											generally
Energy Saving Trust (2003), p.37											in UK 1994 - 2002, disadvantaged
Boardmann (1991)											in low income households
Sheldrick (1998)		"almost all"									in 100 low income households in Ireland



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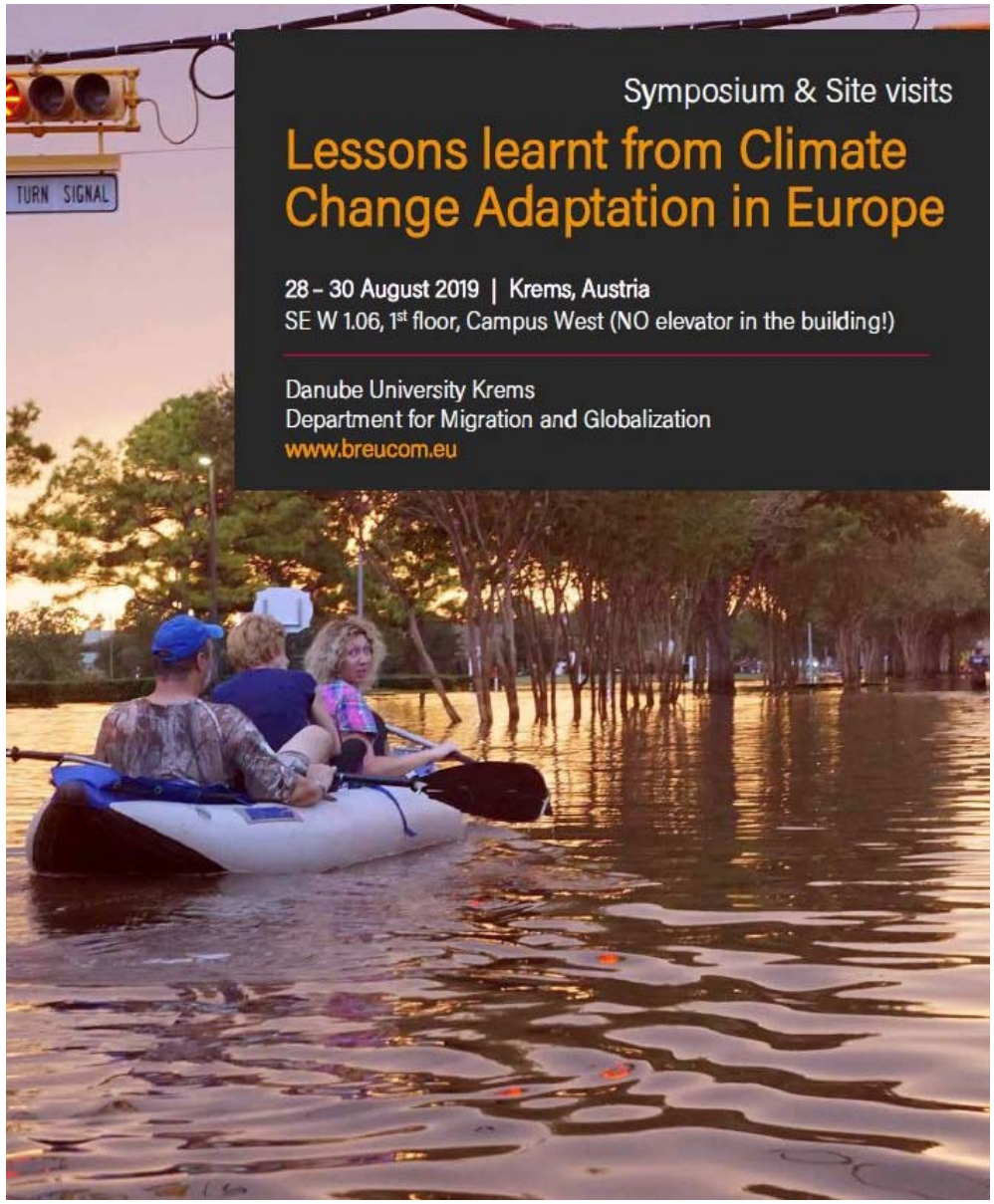

B_RE_U_COM_
Building Resilient Urban Communities

Co-funded by the Erasmus+ Programme of the European Union

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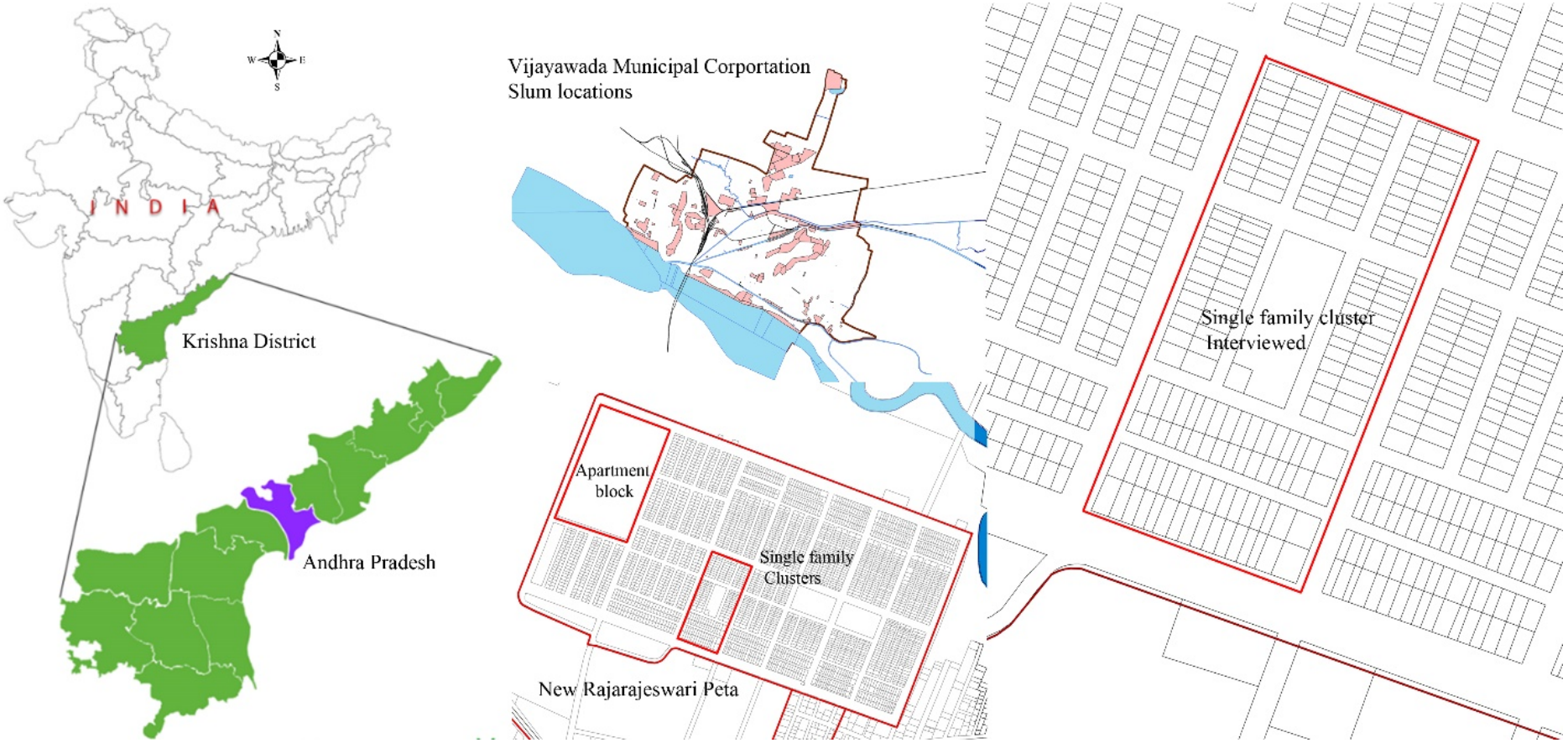
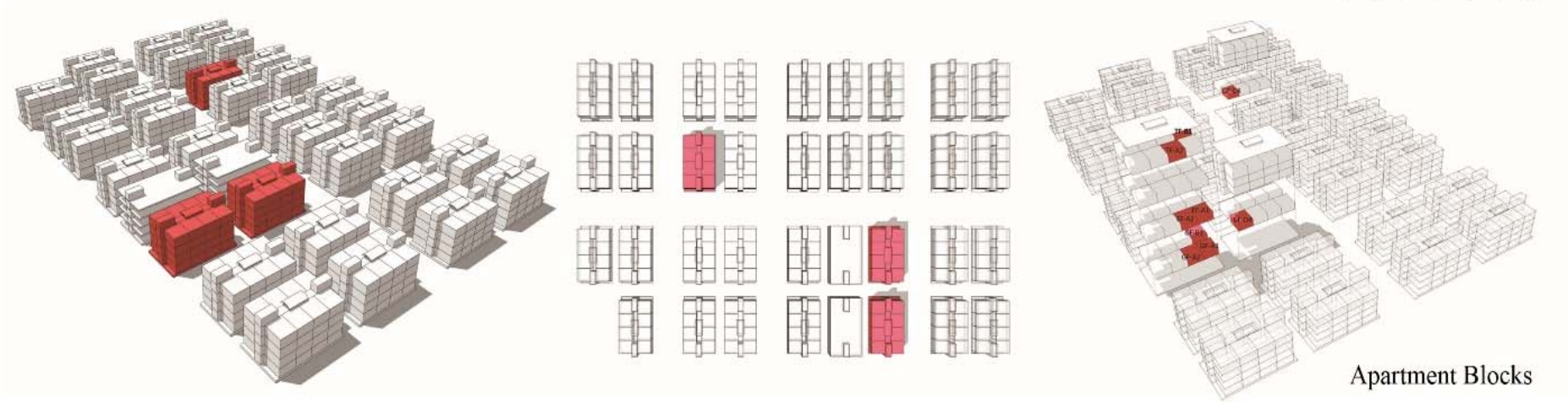
DONAU UNIVERSITÄT KREMS


N
W
E
S
INDIA
Krishna District
Andhra Pradesh
Vijayawada Municipal Corportation
Slum locations
Apartment
block
Single family
Clusters
New Rajarajeswari Peta
Single family cluster
Interviewed

Single Family Units



Apartment Blocks

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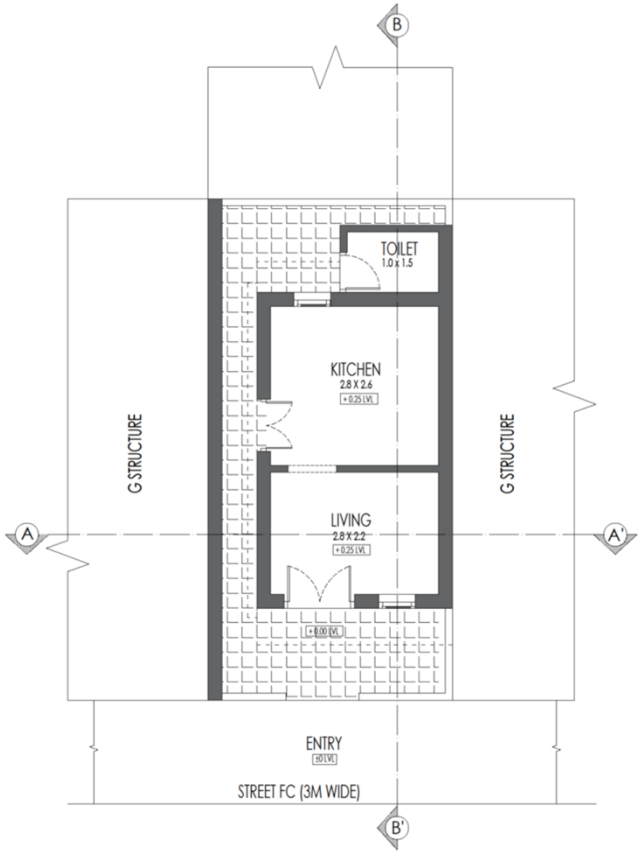
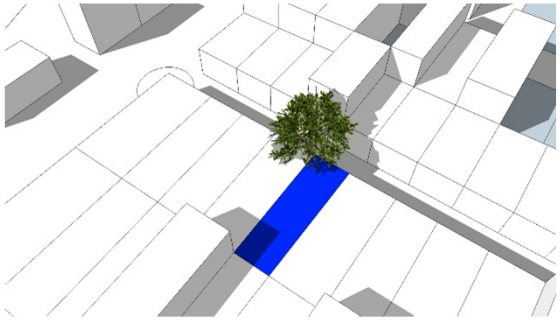
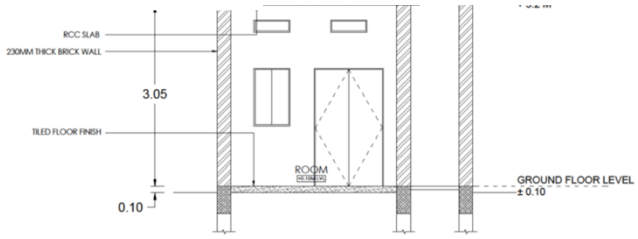
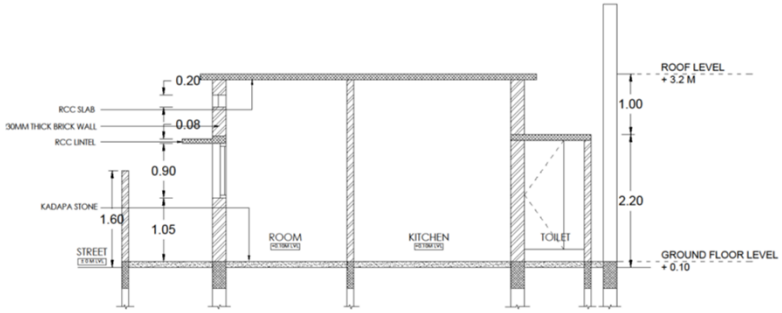




Case 4
Case ID :- F B 07
Plot Size :- 32.9 sq.m
Occupant Name :- Mrs. Esther
Occupancy :- 6
Material Specification :
Wall :- Bricks with cement plastering
Roof :- RCC with cement plastering
Floor :- Kadapa tiles with cement mortar
Openings :- precast concrete frame with wooden shutters for doors and windows



SECTION AA



SECTION BB

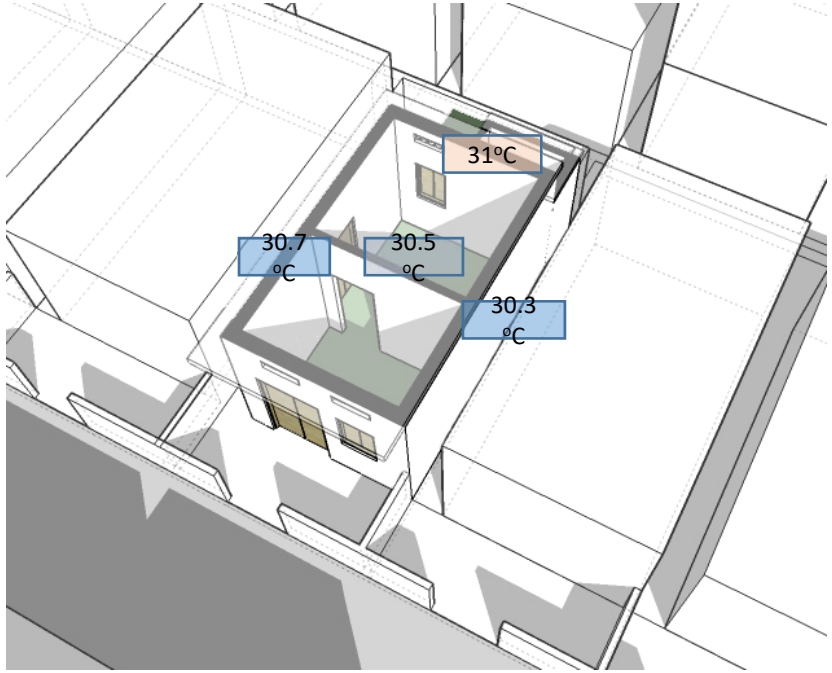
PART 1- BACKGROUND		Date	01-08-2019
1.1 Case Type	Individual House	Case Building Ref.ID	C4(F-B-07)
	Apartment	Floor Level	Ground Floor
1.3 Respondent's Age	60 years	1.4 Gender	Female
1.5 Respondent's Education	-	No. of Occupants	06
1.6 Occupation	Daily Wage Labour		
1.7 Living History/Duration of Stay	50 years in Vijayawada/ 1 year in current residence		

PART 2 - THERMAL CONDITIONING AND RADIANT OBJECTS					
2.1. Major Devices (Spaces – Living/ Bedroom/ Kitchen/ Balcony)		Space 1 (Room 1)	Space 2 (Room 2)	Space 3 (Outside)	Space 4
	Television	1			
	Ceiling Fan	1	1		
	Water Cooler	1			
	Lights	1	1	1	
Condition of Openings		D-Open, W-Close	D-Open, W-Close		

PART 3 - THERMAL ENVIRONMENT ASSESSMENT					
3.1. Thermal Measurement (Spaces – Living/ Bedroom/ Kitchen/ Balcony)		Space 1	Space 2	Space 3	Space 4
	Air Temperature	30.9°C	30.9°C	30.9°C	
	Relative Humidity				
	Air Velocity	0.11m/sec	0.07m/sec	0.07m/sec	
	Radiation				
3.2 Thermal Perception Survey	Clothing	Saree, Blouse – 1.1			
	Activity	Standing, Relaxed - 1.2			
	Thermal experience	Summer- Hot(3), Winter- Neutral(0), Rainy- Slightly Warm(1)			
	Overall Comfort	Uncomfortable- 2			
	Thermal tolerance	Very Difficult to tolerate- 3			
Time of Measurement		4:20 PM			

PART 4 - OCCUPANT ACTIVITY SCHEDULE					
4.1 Activity Mapping		Space 1 (Room 1)	Space 2 (Room 2)	Space 3 (Outside)	Space 4
	05:00 – 08:00	Household work	Cooking		
	08:00 – 11:00	Household work			
	11:00 – 14:00			Work	
	14:00 – 17:00	Sleeping			
	17:00 – 20:00	Sitting/Dinner	Cooking	Household work	
	20:00 – 23:00	Sleeping			
	23:00 – 02:00	Sleeping			
	02:00 – 05:00	Sleeping			

PART 5- ADAPTATION STRATEGY					
5.1 Major Adaptation Strategy		Space 1 (Room 1)	Space 2 (Room 2)	Space 3	Space 4
		Water Cooler	Ceiling Fan		

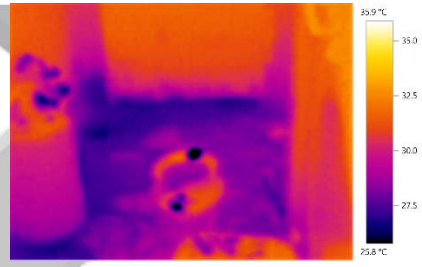


Surface temperature of Long wall

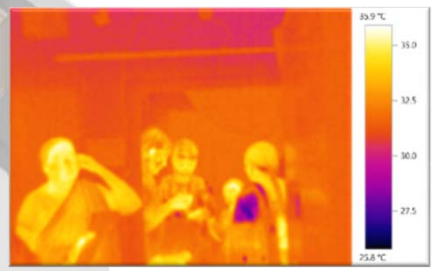
Surface temperature of Short wall

Surface temperature of Ceiling

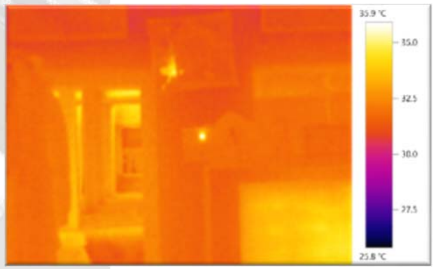
HOUSE: **TF-B1**



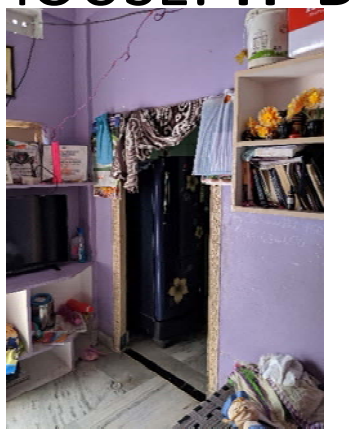
Kitchen interior wall

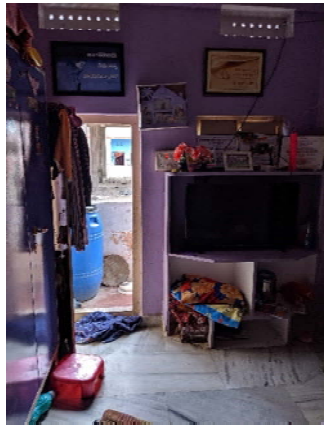


Living area wall



Balcony wall





ROOM	AMBIENT TEMPERATURE
Living Area	31.4° C
Bedroom	31.6° C
Kitchen	31.3° C
Balcony	31.7° C

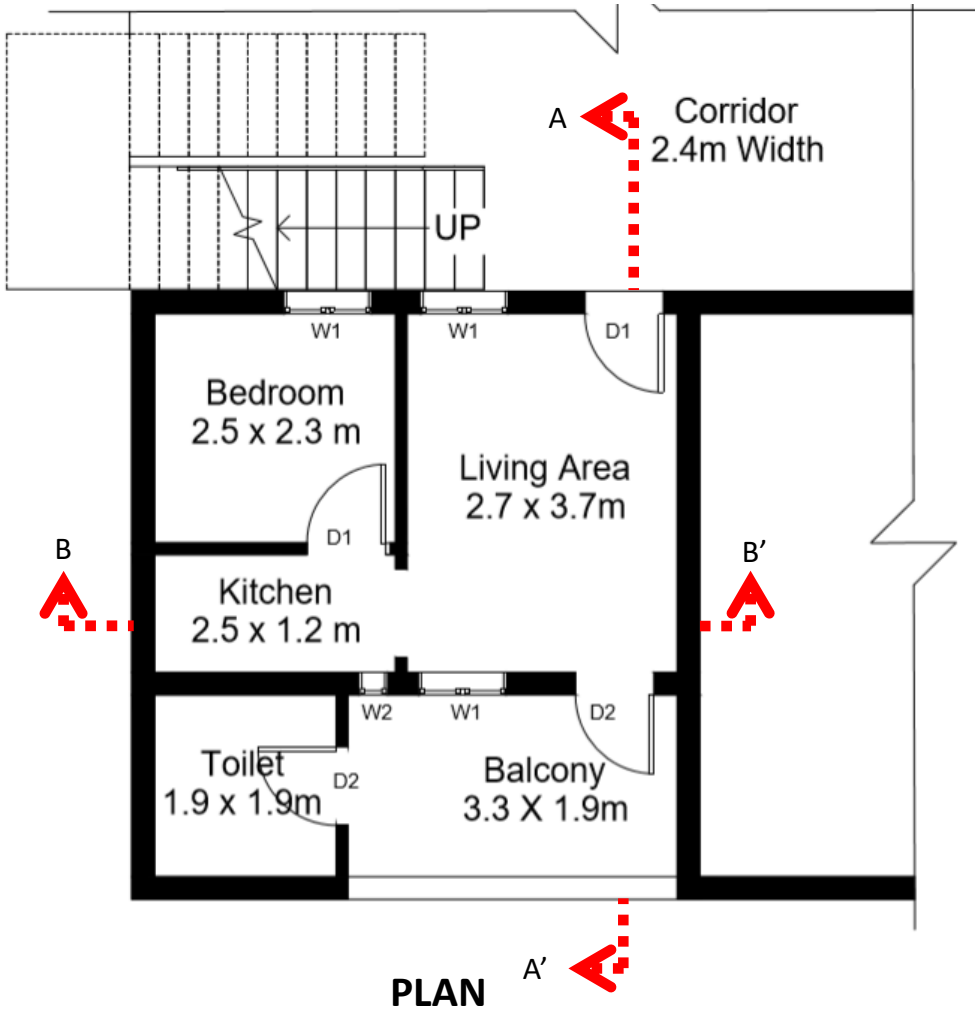
LEGEND:

Surface Temperature of Specific wall

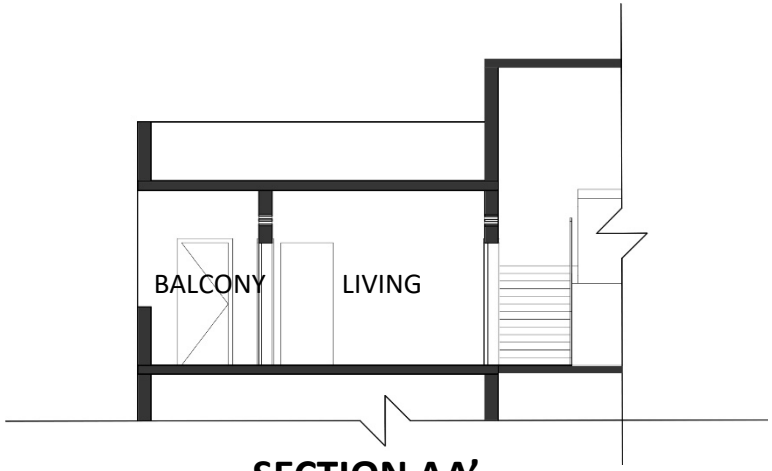
Thermal Imaging of Specific wall

Roof Temp. 30.8° C

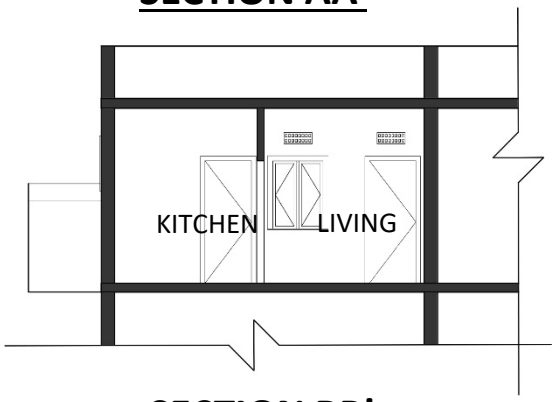
HOUSE: **TF-B1**



PLAN



SECTION AA'



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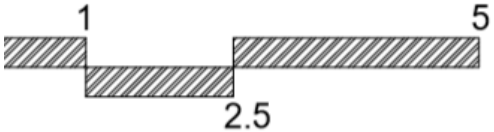


NORTH

“We are the people who work hard for earning and hardworking people don’t care about sun and rain.”

“It feels hot even when we leave the doors open and we can’t sleep; if we close them, you can imagine the situation. [.....] We sleep inside the house because we fear mosquitoes. They will show the hell to us.”

Residents of New Rajarajeswari Peta

“We come home after working all along the day; at least we expect a peaceful sleep during night so that we can go for work the day after. But we are not able to sleep in the house.”

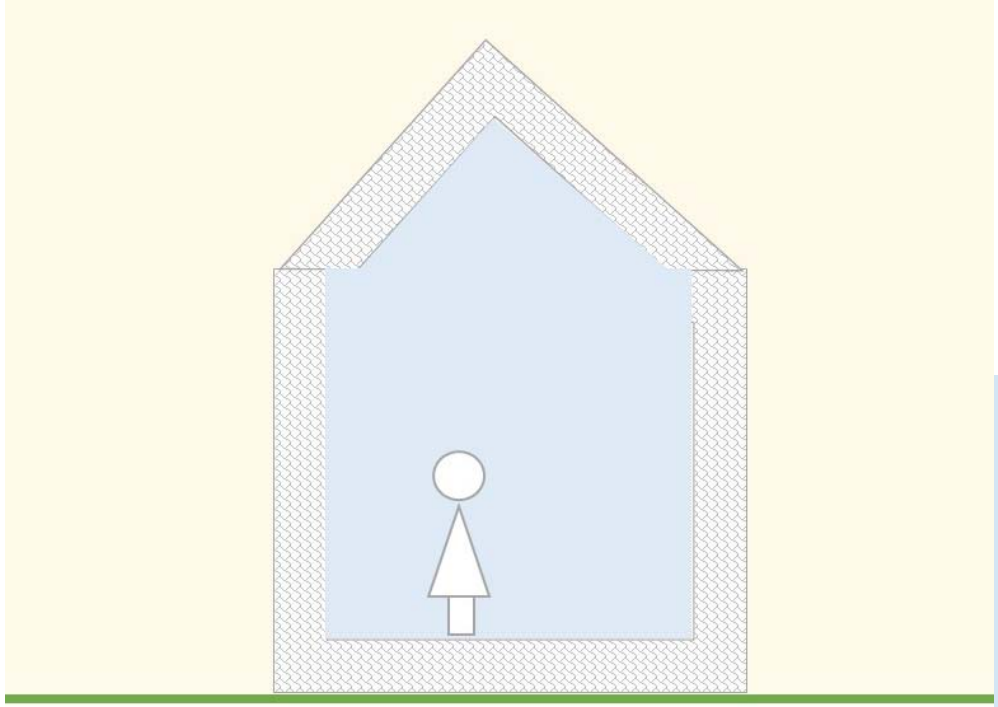
“Because of these extreme heat conditions, we stopped our works for almost 2 months”.

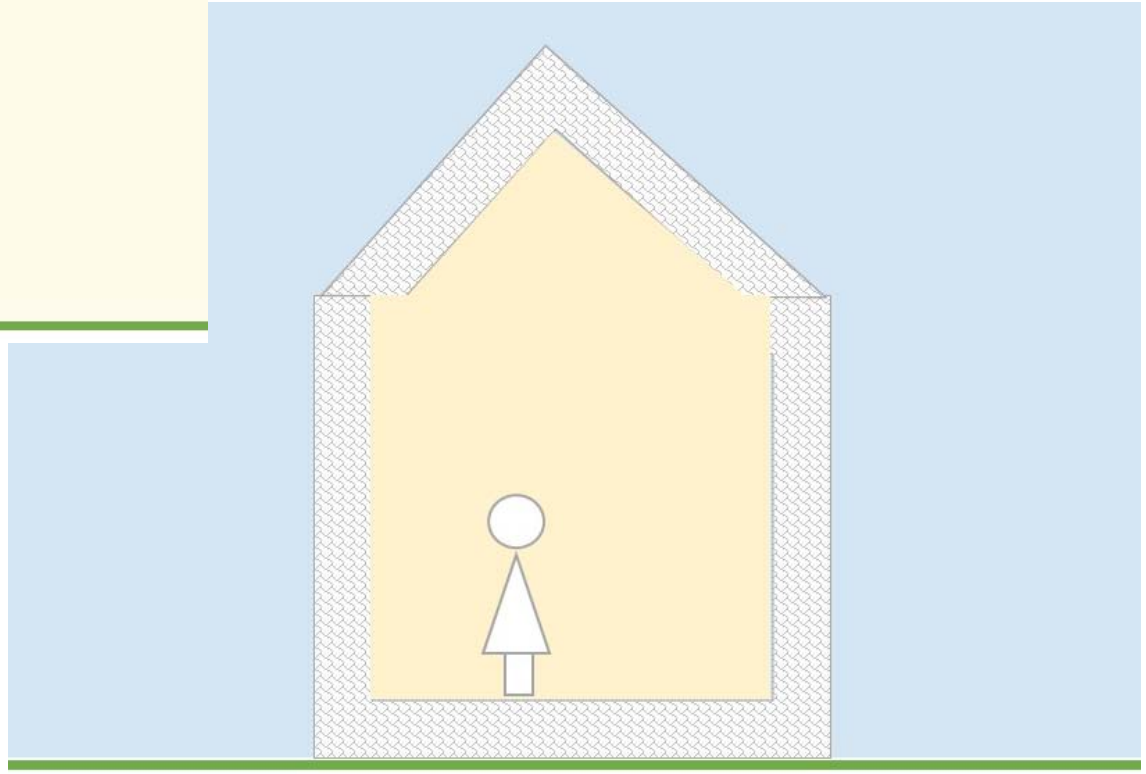
Male resident

“If we go to places like that, we have to spend some Rs.2000/- or more*. If we spend one day like that, our greed of staying in such places won’t be ending. So, we will be in trouble after that”.

Resident of New Rajarajeswari Peta, father of two

* 1 EUR = Rs. 87 (12.10.2020)





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Ergebnisse

- **Hitzetoleranz** ist eine billige Anpassungsstrategie
- Besonders von Hitze betroffen sind **im Freien manuell Arbeitende** im informellen Sektor, mit entsprechenden **Einkommenseinbußen**
- **Im Gebäude zu bleiben** stellt eine bevorzugte Strategie zur Vermeidung von Hitzschlag dar (Vermeidung von direkter Sonneneinstrahlung); **schlechte Gebäudesubstanz** vermindert Wirksamkeit dieser Strategie
- Betroffene haben **wenig Einflussmöglichkeit** auf (thermische) Wohnsituation

Herzlichen Dank für Ihre Aufmerksamheit!

Zum Weiterlesen:
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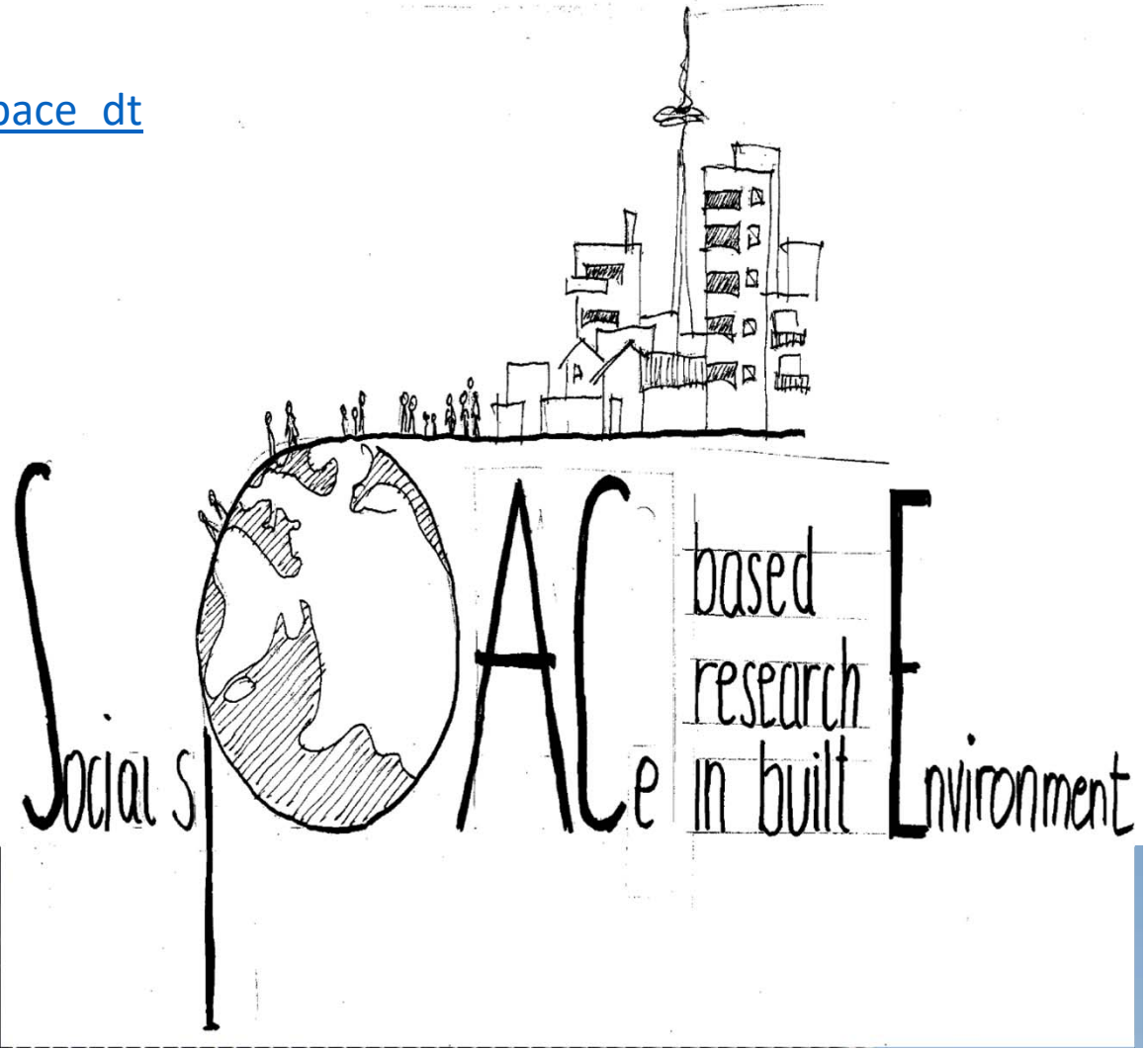
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