NEW INDRA VIHAR

SUMMARY OF RESULTS

FROM THE RESEARCH PROJECT
CLIMATE-RESILIENT SLUMS:
A SYSTEMS APPROACH FOR INCLUSIVE CLIMATE IMPACT ASSESSMENT

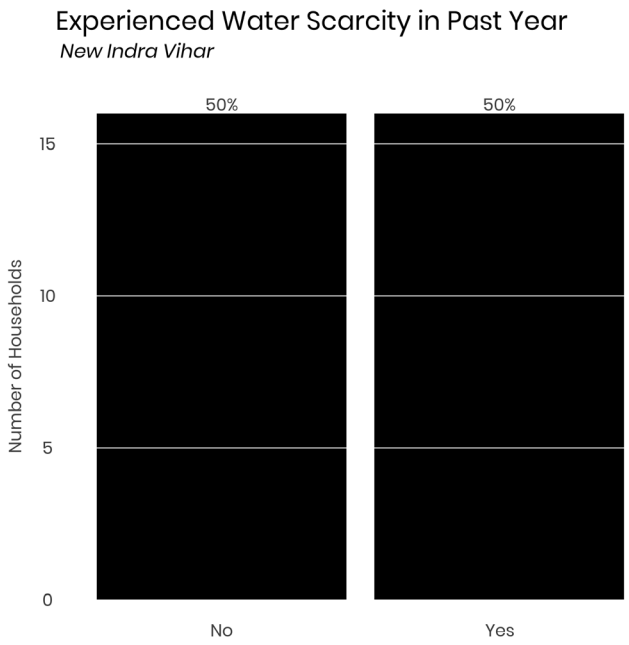
For further information see the online dashboard here:
https://waterresilientcities.shinyapps.io/RAEng/

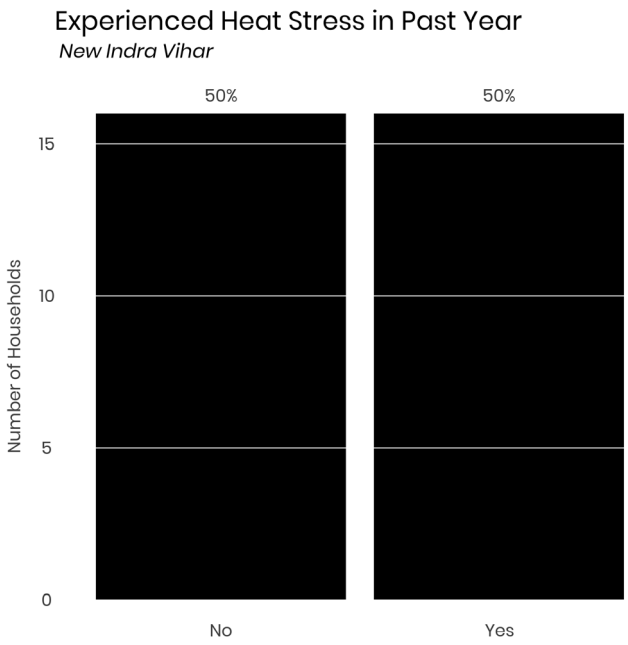
Or contact: m.bedinger@hw.ac.uk

PROFILE

New Indra Vihar is the smallest area in the study. There were **32** respondents representing **187** people. For every household, there are **5.8** residents, making this the 3rd densest area. All areas had a median age of ~37 years and mean age of ~39 years, roughly consistent with the overall means. In New Indra Vihar, respondents' ages ranged from 28-60.

In the past year, **almost all (> 98%)** households experienced flooding, **50%** experienced water scarcity (the highest rate of any area), and **50%** experienced heat stress. Thus the most widespread hazard was flooding, followed by heat stress and water scarcity.

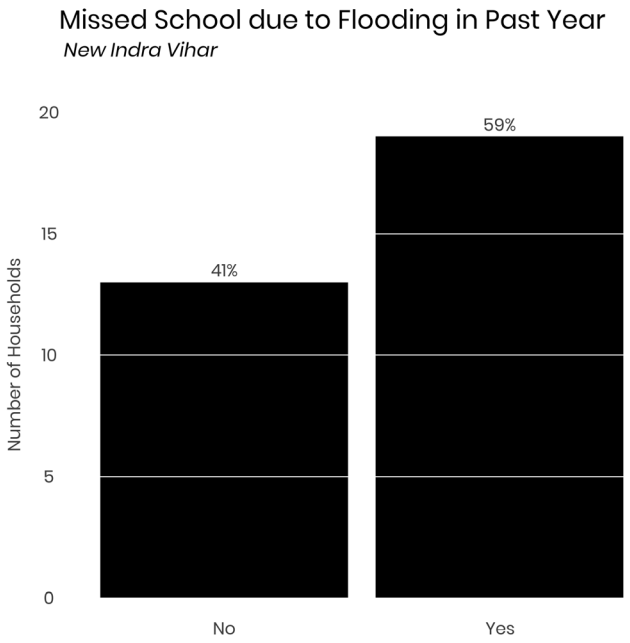


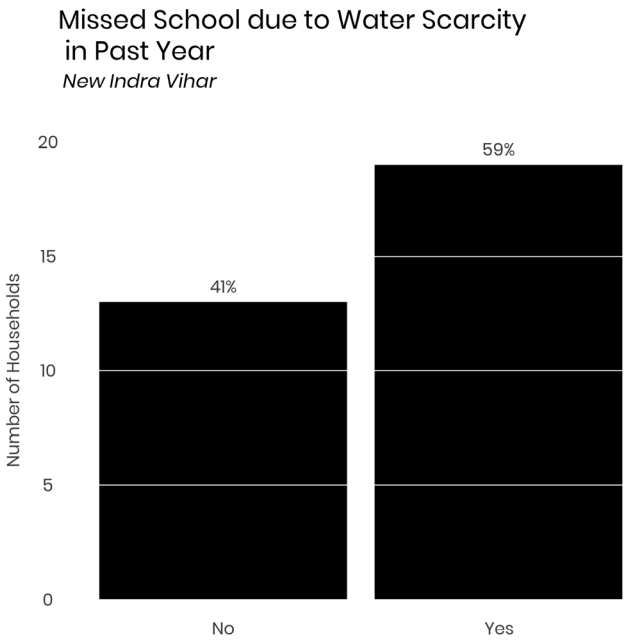


Collectively, New Indra Vihar experienced **1,617 days** of water scarcity and **172 days** of heat stress. On average in the past year, each household experienced **50.5 days** of water scarcity (the highest rate of any area), and **5.4 days** (the highest rate of any area) of heat stress. No information was gathered about number of days flooding was experienced. Thus the most severe hazard was water scarcity, followed by heat stress, though it should be noted no data around flooding was gathered for a comparison.

EDUCATION

In the past year, **59%** of households had a child miss school at least once due to water scarcity (the highest rate of any area), **59%** had a child miss school due to flooding (the highest rate of any area), and **≤ 28%** had a child miss school due to heat stress. Thus the most widespread threats to missing school were water scarcity and flooding, followed by heat stress.



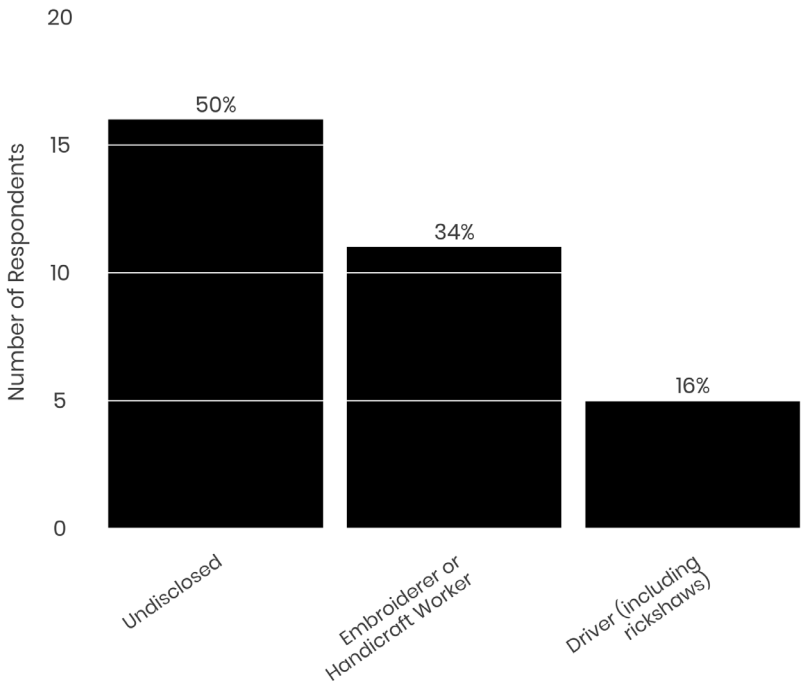


Collectively, households in New Indra Vihar experienced **97 days** of missed school due to water scarcity, **95 days** of missed school due to flooding, and **44 days** of missed school heat stress. On average in the past year, each household had a child miss school due to water scarcity for **3.0 days** (the highest rate of any area), flooding for **3.0 days**, and heat stress for **1.4 days**. Thus the most severe threat to missing school was water scarcity and flooding, followed by heat stress.

EMPLOYMENT

The most common job types in New Indra Vihar were *Undisclosed* (other), *Embroiderer or handicraft worker,* and *Driver (including rickshaws).* In general, **59%** of respondents were informally employed, the highest rate of any area. **56%** of respondents performed at least some of their work outside the slum, the lowest rate of any area.

Most Common Job Types
by Questionnaire Response, New Indra Vihar

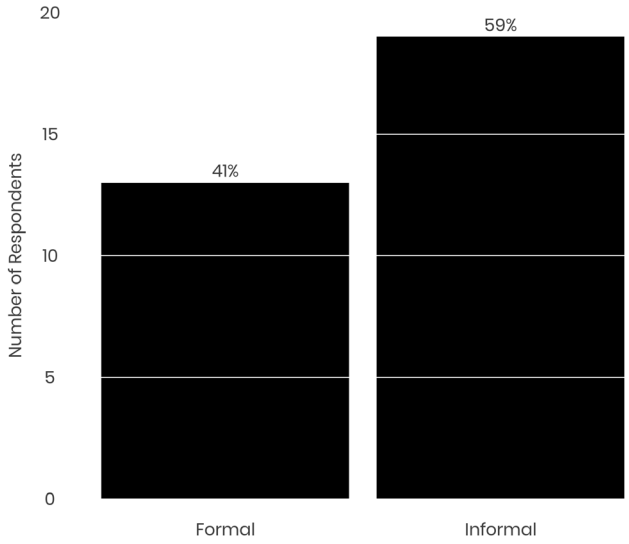


In the past year, **50%** of households also lost work due to flooding. **47%** lost work due to water scarcity (the highest rate of any area) and **44%** due to heat stress.

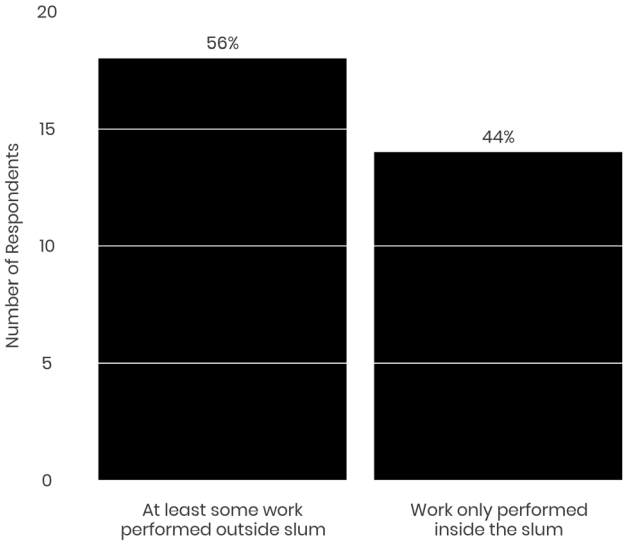
Thus the most widespread threat to losing work was flooding, followed by water scarcity, then heat stress.

Collectively, households in New Indra Vihar experienced **87 days** of lost work due to flooding, **81 days** of lost work due to water scarcity, and **≤ 44 days** of lost work due to heat stress. On average in the past year, each household lost work due to flooding for **2.7 days**, water scarcity for **2.5 days** (the highest rate of any area), and heat stress for **≤ 2.0 days**. Thus the most severe threat to losing work was flooding, followed by water scarcity, then heat stress.

Formal vs. Informal Employment
New Indra Vihar



Typical Work Location
New Indra Vihar



INFRASTRUCTURE

The main sources of drinking water and domestic water by far was *Tanker supplied privately.*

The main point of access to a toilet was *Own toilet within dwelling* or *Own toilet near dwelling*.

The main point of access to bathing facilities was a *Permanent bathroom (with wall and roof) within the house premises*. The main type of electricity connection was *Legal, metered.*

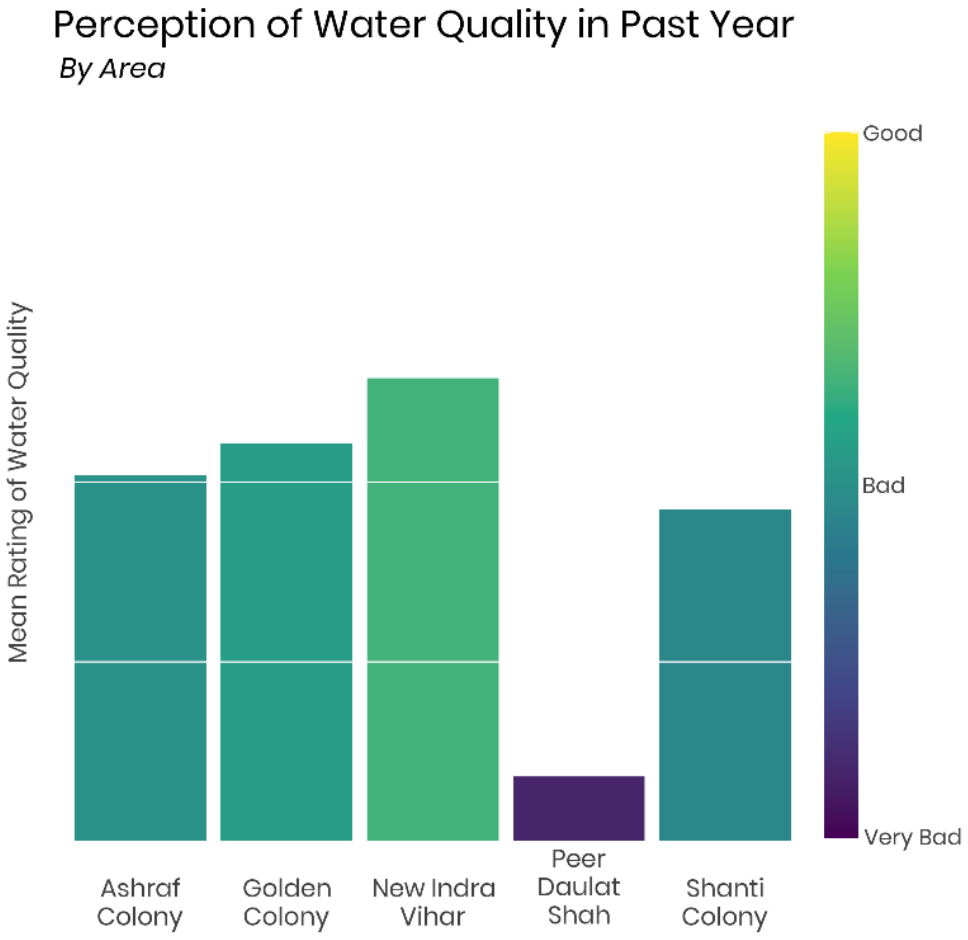
The most commonly reported set of impacts (47% of responses in New Indra Vihar) were for all four uses *Cooking, Drinking, Household sanitation, Personal sanitation.*

The majority of households (≥ 84% of responses in New Indra Vihar) needed to purchase water *Daily, for drinking and domestic purposes.*

The most common coping measures taken to adapt to water scarcity were *Less domestic use, None, Less personal use, More storage,* and *Less appliance use.* This suggests uptake could be improved for *Used conservation tool* or *Used rainwater harvesting*.

34% of households experienced property damage because of flooding.

On average, residents rated their water quality as ***Bad***. However, New Indra Vihar had the highest rating of any study area.



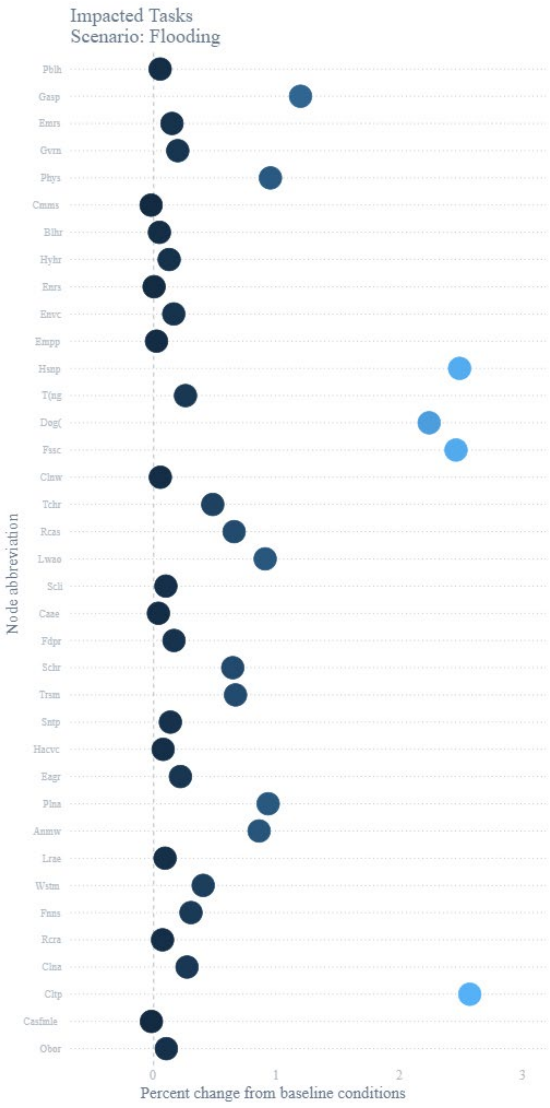
URBAN SYSTEMS

Outcomes are goals for making cities and communities resilient to change. When outcomes are strained, it means the current situation has put these prerequisites for future resilience at risk. In New Indra Vihar, the most impacted outcomes were:

- For flooding, *Minimal vulnerability* was impacted with a **+1%** strain. This is about the extent to which everyone's basic needs are met (e.g. food, water, clothing, housing).
- For heat stress and water scarcity *Diverse livelihoods and employment* was impacted with a **+1%**/**+1%** strain. This is about residents' access to finance, the ability to accrue savings, skills training, business support, and social welfare.

Tasks are the activities needed for a city to function. When tasks are impacted, it means those activities have been prevented from being performed to their normal level. The top three most impacted tasks for each hazard varied by hazard, and included:

- *Clothing provision* (**+3%** more vulnerable than normal). This includes tasks that provide clothing through manufacturing, the supply chain, and maintenance services.
- *Housing provision* (**+2%**/**+2%** more vulnerable than normal). This includes tasks that provide secure housing provision through infrastructure.
- *Learning and education* (**+2%**/**+2%** more vulnerable than normal). This includes tasks that enable learning and education in a formal capacity as well as informal capacity (e.g. from cultural and recreational learning).
- *Animal welfare* (**+2%** was more vulnerable than normal). This includes tasks that contribute to the welfare of domesticated animals, livestock and wildlife.
- *Goods and services provision* (**+2%** more vulnerable than normal). This includes business activity that provides goods and services.
- *Employment provision* (**+2%** more vulnerable than normal). This includes tasks that enable access to employment, provision of employment, and wellbeing in the workplace.
- *Social interaction* (**+2%** more vulnerable than normal). This includes functions that support meaningful social interaction within a city.



For New Indra Vihar, all three types of hazard had similar impacts on activities in the 'urban system', with flooding having the biggest impact by a very small margin. Flooding impacted different resilience outcomes than heat stress or water scarcity.