

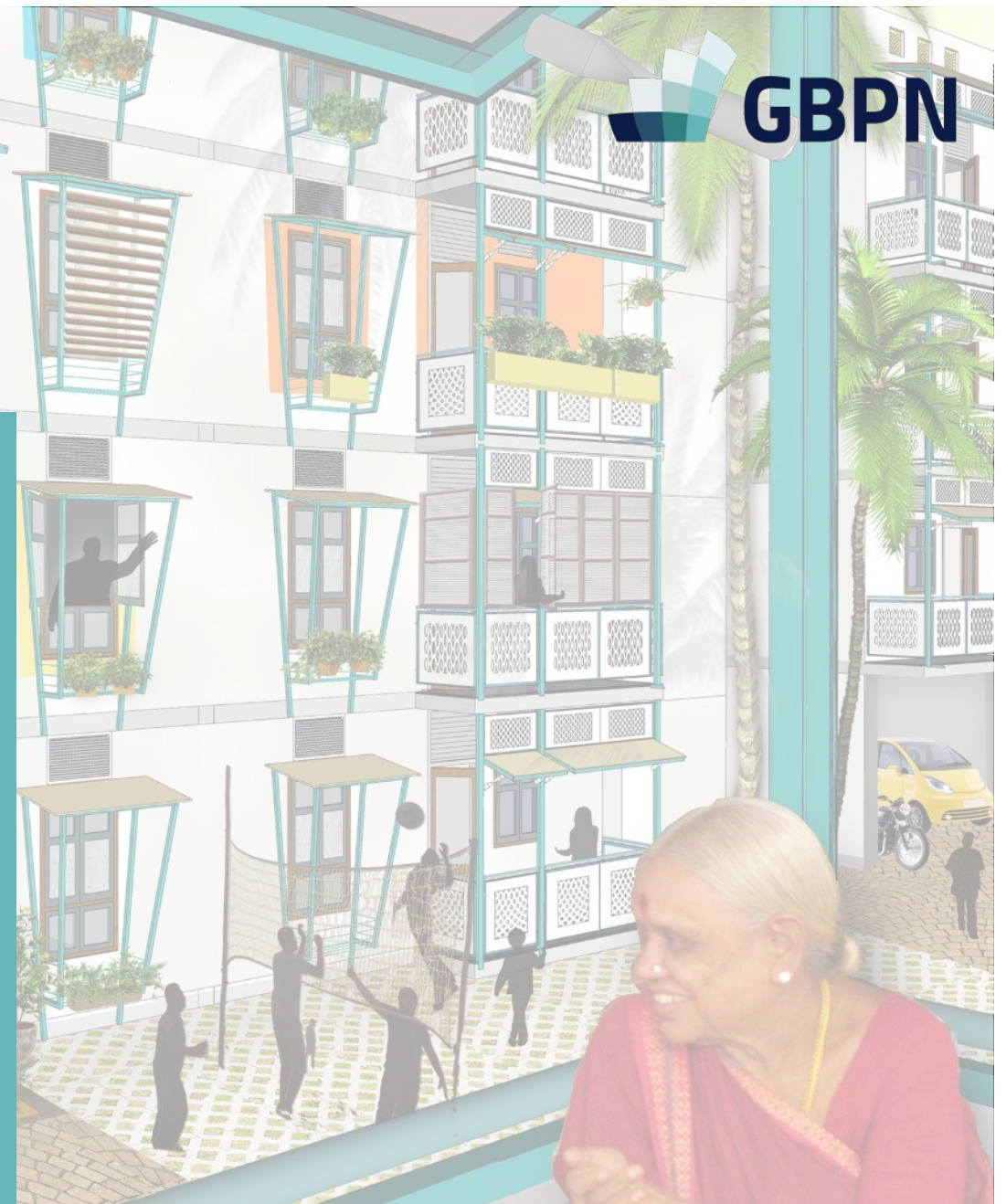


HEALTHY AFFORDABLE HOMES FOR INDIA

White Paper

Prepared by: Ashok B Lall Architects

July 2023



PROJECT TEAM



GLOBAL BUILDINGS PERFORMANCE NETWORK (GBPN) FUNDING AGENCY

- Not-for-profit organisation.
- A mission to reduce the impacts of climate change through policy reform in the buildings sector.

- Project coordination
- Technical & logistical support
- Media and outreach



MONASH UNIVERSITY, AUSTRALIA INTERNATIONAL RESEARCH PARTNER

- International research- intensive university, delivering education and research excellence across the Indo-Pacific.
- Work towards addressing climate change and fostering thriving communities.

- International review of best practices - with focus on Health
- Expert dialogue



ASHOK B LALL ARCHITECTS (ABLA) IMPLEMENTATION PARTNER

- Architecture practice with focus on sustainable and energy efficient buildings
- Active in research on affordable, sustainable, and low-carbon housing for urban India

- Research and development
- Stakeholders engagement
- Fieldwork & documentation



INDIAN INSTITUTE OF PUBLIC HEALTH – GANDHINAGAR (IIPH-G) CONSORTIUM PARTNER

- India's first and largest Public Health University.
- Works to strengthen the health system in India through education, training, research, and advocacy/policy initiatives.

- Project support from public health perspective

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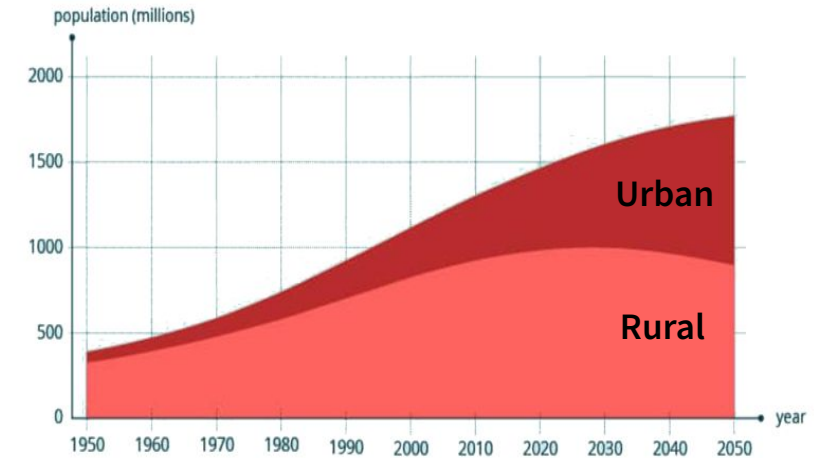
1. CONTEXT

1.1 RAPID URBANISATION – DEMAND FOR AFFORDABLE HOUSING

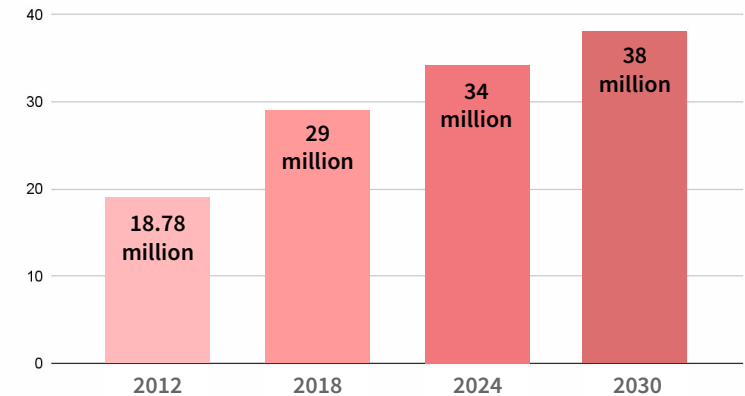
Over 50%
of India's population

is projected to be urban by 2050. (WUP, 2018).

- From 2018 to 2050, it is projected that India will have added **416 million** urban dweller (WUP, 2018). This puts a huge demand for affordable urban housing.
- As per estimates, the urban housing shortage was **29 million in 2018**, compared to **18.78 million** in 2012 (ICRIER, 2020; MHUPA, 2012).
- **96 to 99 percent** percent of this urban housing shortage is confined to low-income groups (EWS and LIG).



Estimated population growth in India by 2050. (Source: GIZ India, Urbanet)



Estimated urban housing shortage in India in 2030 (Source: Author)

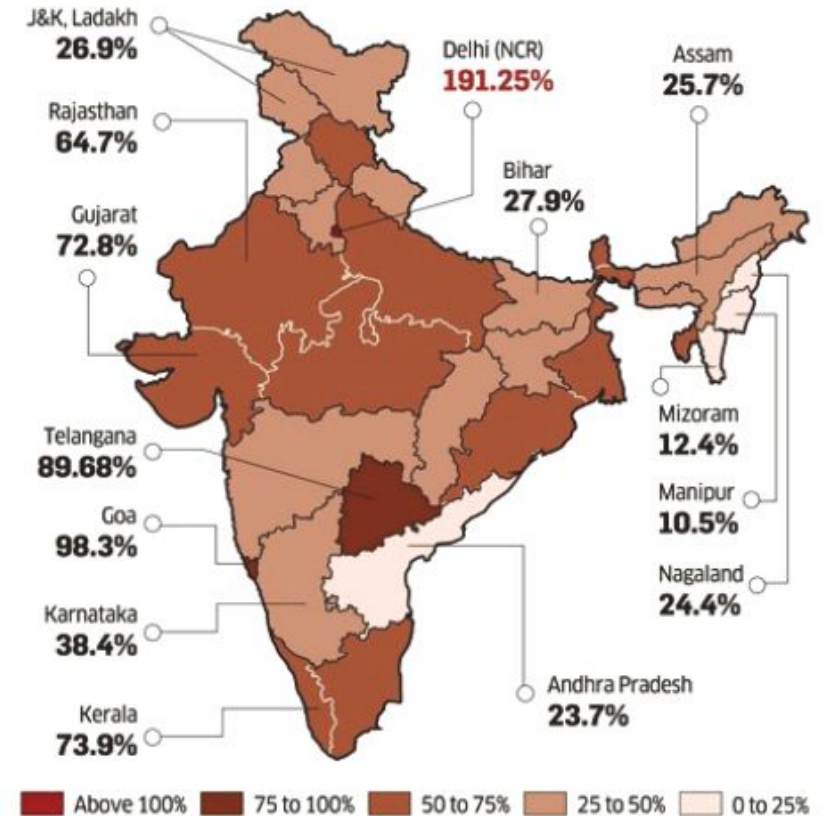
1. CONTEXT

1.1 RAPID URBANISATION – DEMAND FOR AFFORDABLE HOUSING

Under the PMAY(U) mission
12 million houses
have been sanctioned,
with half of them yet to be constructed.

- Hitherto, the focus has been on an arithmetic pursuit of rapidly delivering **quantities** of dwelling units.
- The **qualitative** attributes such as climate appropriateness for comfort, health and wellbeing, and environmental impact remain neglected.
- Houses built under the Mission will last at least **50-60 years**, and thus have a potential to **impact resource usage** and **wellbeing of inhabitants** during their lifespan.

PMAY - U PROGRESS IN STATES



State-wise progress of PMAY in 2022. (Source: www.deccanherald.com; 2022)

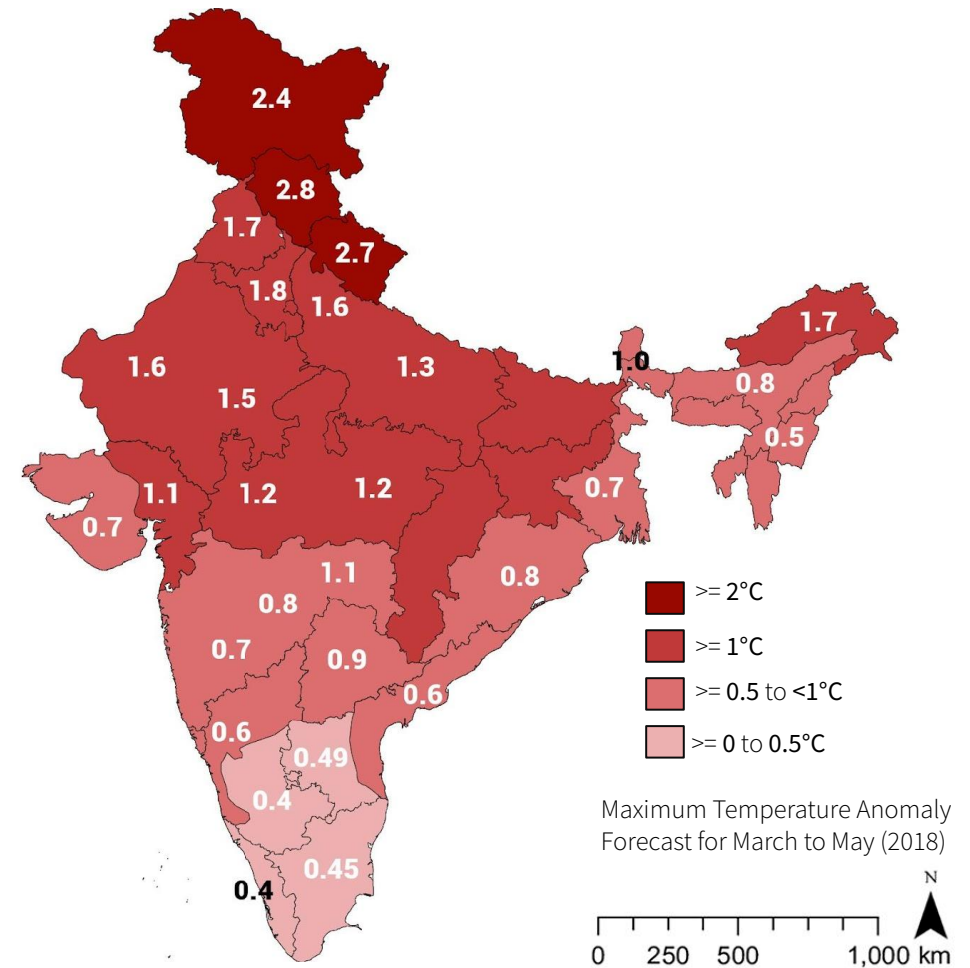
1. CONTEXT

1.2 CLIMATE CHANGE - ADAPTATION AND REDUCING EMISSIONS

Over 75%
of Indian districts

are hotspots of extreme climate events (CEEW, 2020).

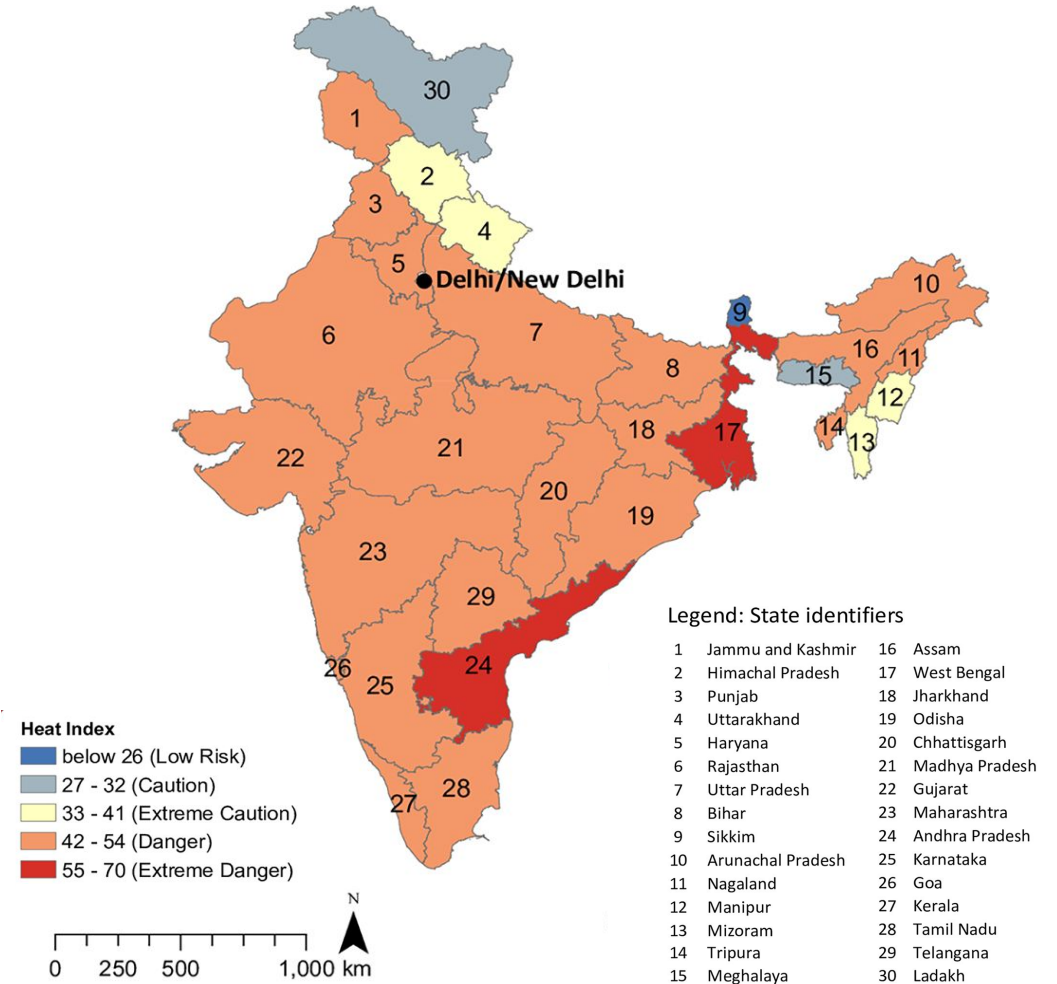
- Research show that the country's average temperature is expected to rise by **4.4 degree** Celsius by the end of the year 2100 (MoES, 2020).
- IPCC recognises that the **poor populations of the Global South**, due to their paucity of resource, will be the most affected by the **stress** and **disruption** caused by climate change.
- Designers and builders often do not adapt **passive design strategies for climate comfort**, leading to greater **discomfort**.



1. CONTEXT

1.2 CLIMATE CHANGE – ADAPTATION AND REDUCING EMISSIONS

- The **rise in temperatures** is coupled with the increase in the duration and intensity of **heat waves** over large parts of the country.
- This gets accentuated further in urban areas, compounded by the **Urban Heat Island (UHI) effect**, with temperatures rising up to 50 deg. C.
- Besides the potential **health hazards**, this also increases the **demand more energy** (e.g. fans and air-conditioners), that would add to GHG emissions.
- In the case of Affordable Housing in India, the short term demand for energy is limited, but a **latent demand for energy** can be expected as disposable incomes increase within low-income groups, making **passive design** and **energy-efficient strategies** important.



Heat Index of different states in India. (Source: Debnath et al, 2023)

1. CONTEXT

1.3 HEALTH AND WELLBEING – WITH FOCUS ON A GENDER PERSPECTIVE

- The palpable effects of **climate change** – heat waves, drought, storms and floods – affect most the **health and wellbeing** of those who are poor.
- India is estimated to have around **42 million home-based workers**, most of them **women**. For them, **heat waves** have dealt a cruel **double blow**, affecting both their **health** and **productivity**.
- Moreover, the trend in affordable housing is towards **high-rise** and **high-density**. For small homes (30 - 50 sq m) with large household sizes, high-densities tend to create **social** and **psychological stresses**, felt mostly by **women** and **young girls**.
- High-rise and high-density create a feeling of **loss of privacy** and **threat to safety** among **women**, and a sense of **alienation** and **confinement** for **elderly** and **children**.

As heat waves sweep South Asia, they take a hidden toll on women

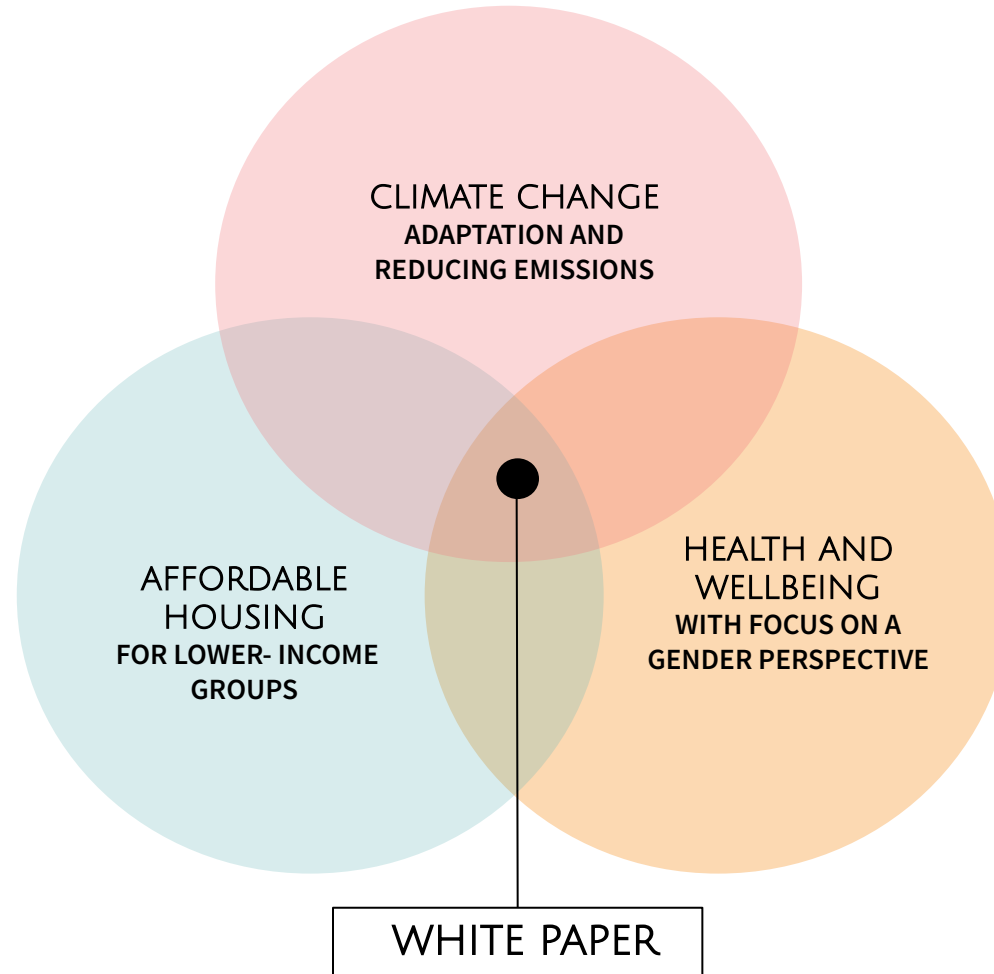
by  Disha Shetty
June 27, 2022
Co-published with Scroll



(Source :www.fullerproject.org)

2. THE WHITE PAPER

2.1 FRAMEWORK



2. THE WHITE PAPER

2.2 SCOPE

A holistic definition
of 'Health and Wellbeing'
appropriate for affordable housing.

01

Considerations for **physical, social** and **psychological health** of low-income communities.

02

Setting **health** and **climate resilience** related **standards** for design of affordable homes and neighborhoods.

03

Taking into account the felt needs of **women**, the **elderly** and the **sick**, and **children**, along with their need for **secure social interaction**.

04

Recommendations for upgrading codes and regulations, along with necessary **institutional and regulatory frameworks**.

2. THE WHITE PAPER

2.3 OPPORTUNITIES - COMPLEMENTARY NATIONAL INITIATIVES



National Action Plan for Climate Change (NAPCC), 2008 –
National Mission on Sustainable Habitat (NMSH).

Bureau of Energy Efficiency (BEE) - **Design Guidelines for Energy Efficiency Multi-Storey Residential Buildings, Eco Niwas Samhita (ENS)**



National Disaster Management Authority (NDMA) –
Heat Action Plans (HAPs)



2. THE WHITE PAPER

2.3 OPPORTUNITIES - COMPLEMENTARY NATIONAL INITIATIVES



United Nations (UN) – **Sustainable Development Goals (SDGs)**

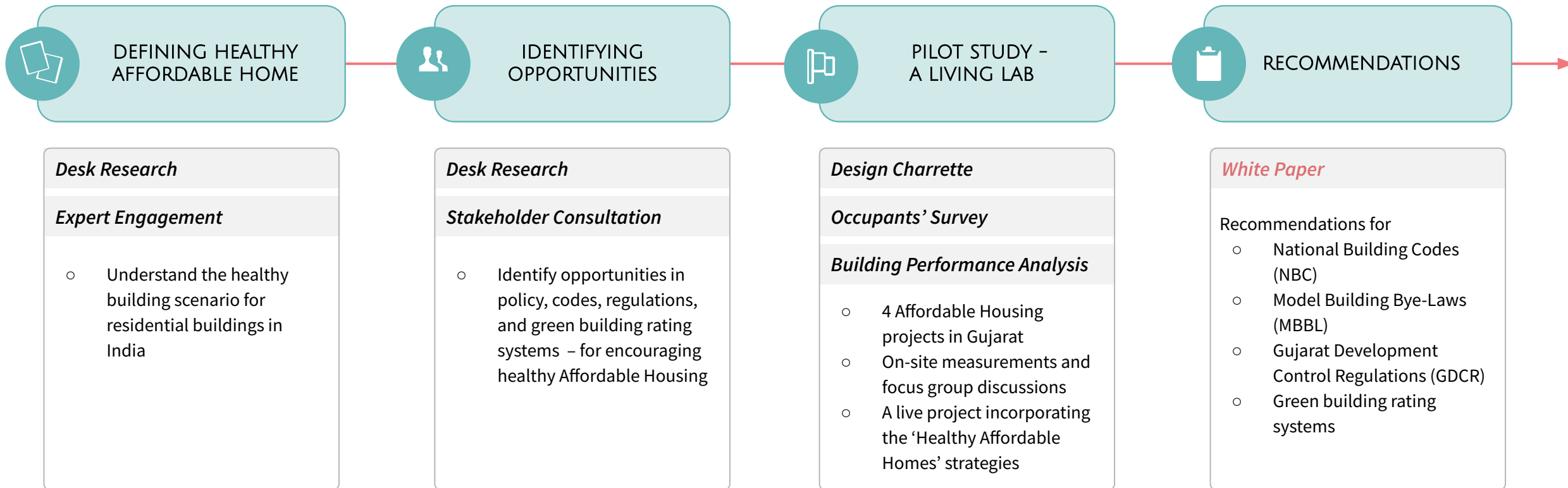
India's **Nationally Determined Contribution (NDC)** Commitments



Affordable Housing finance – at concessional interest rate for 'green' outcomes

2. THE WHITE PAPER

2.2 METHODOLOGY



3. HEALTHY HOMES

3.1 DEFINING HEALTHY AFFORDABLE HOMES – LITERATURE

- **Healthy Building definition** is of many kinds : WHO, UNEP ...
- Much of the concerns for ‘healthy buildings’ in literature are for **artificially controlled indoor environments in the developed world**: sick building syndrome, indoor air quality, communicable infectious diseases, active cooling anticipating temperature rise and heat waves.
- **No theoretical framework to define ‘healthy buildings’ for the developing countries** like India - where majority of buildings, especially residential buildings for lower income groups, **are not closed and artificially conditioned**.



WHO

“...supports a state of complete **physical, mental** and **social** well-being”.



UN HABITAT

“Provides **protection** from the elements, **adequate living space**, culturally acceptable **living arrangements**, ..”

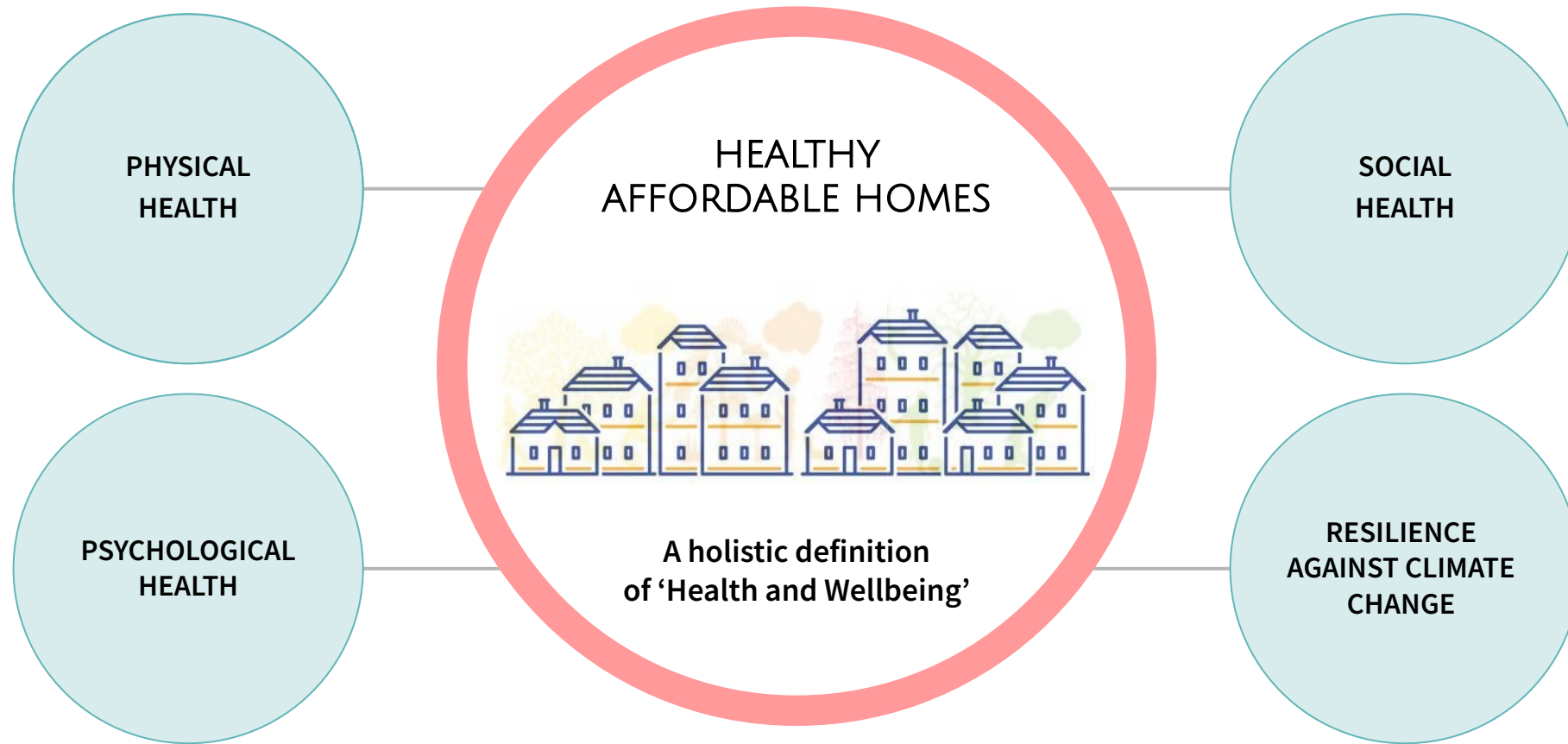


LEED

“By intentionally deploying **green building strategies** ...promote **health and well-being** ..”

3. HEALTHY HOMES

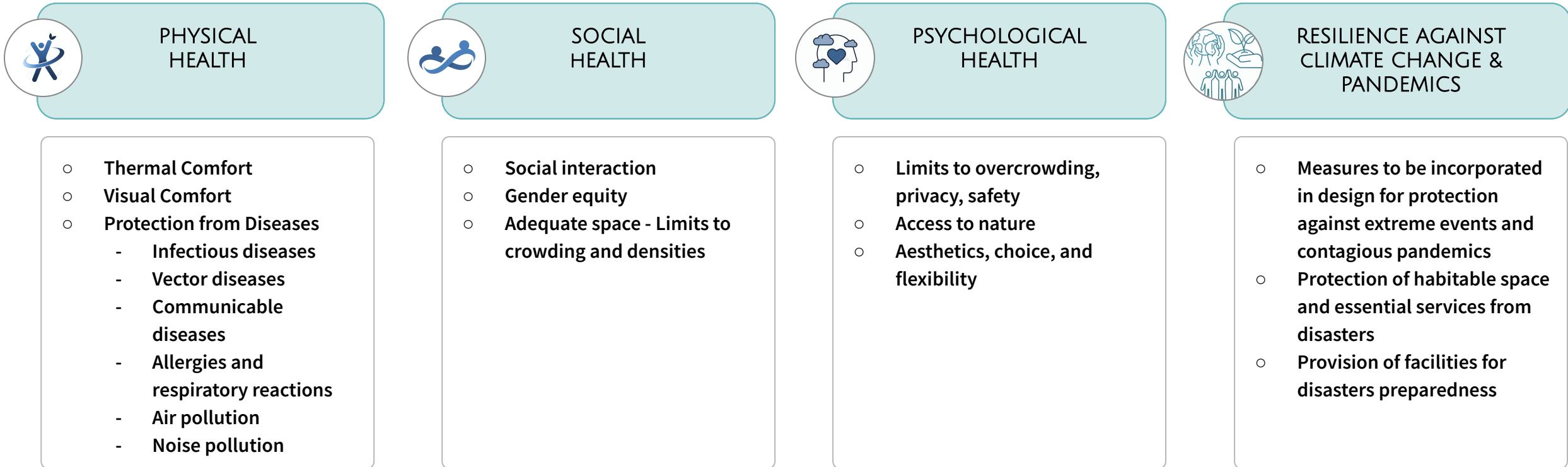
3.1 DEFINING HEALTHY AFFORDABLE HOMES - PROPOSAL



(Image Source: Helen Farley, Kelley Johnson, Eva Leung, and Jackson Lindsay)

3. HEALTHY HOMES

3.1 DEFINING HEALTHY AFFORDABLE HOMES - INDICATORS



Applicable to the individual home, the building, the residential community, and the neighbourhood.

3. HEALTHY HOMES

3.2 PHYSICAL HEALTH

Healthy Building and its neighborhood will –

Optimise the integration of **climate-responsive passive design** strategies and **low-energy devices** to maximise the duration of indoor thermal comfort.

Optimise availability of **diffused daylight** during warm/hot periods in all habitable spaces, and also enable its modulation with **external shading systems**.

Ensure **drainage** of all exterior surfaces to avoid waterlogging. Pools and ponds will have larvae eating fish. Indoor spaces will be **protected from mosquitoes** with netting.

Enable **good ventilation** in habitable indoor gathering and meeting spaces, and avoid causes of **dampness** in indoor spaces and provide means of flushing out or removal of **humidity**.

Require residential neighborhoods to be segregated from heavy traffic arteries and will **minimise the intrusion of air polluting** motor vehicles and their movement within the residential zones.

Require residential zones to be **protected from loud noise** of traffic or other sources of loud noise.

(Image Source: Helen Farley, Kelley Johnson, Eva Leung, and Jackson Lindsay)

3. HEALTHY HOMES

3.3 SOCIAL HEALTH

Healthy Building and its neighborhood will –

Promote social health by designing outdoor and common **shared spaces for social interaction**, group activities and recreation.

Provide space for **recreation** of children and youth, and **sheltered spaces** for group activities.

Provide convenient access to **community health and resilience centres** equipped for protection and care for the most vulnerable residents during pandemics and heat waves.

Meet the special concerns and needs of **women** residents with respect to **hygiene, facilities for health care and workspaces** for income generation.

Engage **women as equal stakeholders** in the operation, management and maintenance of the shared community assets.

Meet **minimum standards for space per person in homes**, in the common spaces within buildings and as 'habitable' outdoors and terraces.

(Image Source: Helen Farley, Kelley Johnson, Eva Leung, and Jackson Lindsay)

3. HEALTHY HOMES

3.4 PSYCHOLOGICAL HEALTH

Healthy Building and its neighborhood will –

Observe **limits to occupant density** to avoid **overcrowding** and offer occupants the means of balancing their needs for community and for **privacy** according to their preferences.

Integrate positive **open green** and will provide places, **terraces and balconies for growing and tending plants** by residents.

Provide useful **flexibility** in the design of structural systems and planning of internal spaces of the residential units.

(Image Source: Helen Farley, Kelley Johnson, Eva Leung, and Jackson Lindsay)

3. HEALTHY HOMES

3.5 RESILIENCE AGAINST CLIMATE CHANGE & PANDEMICS

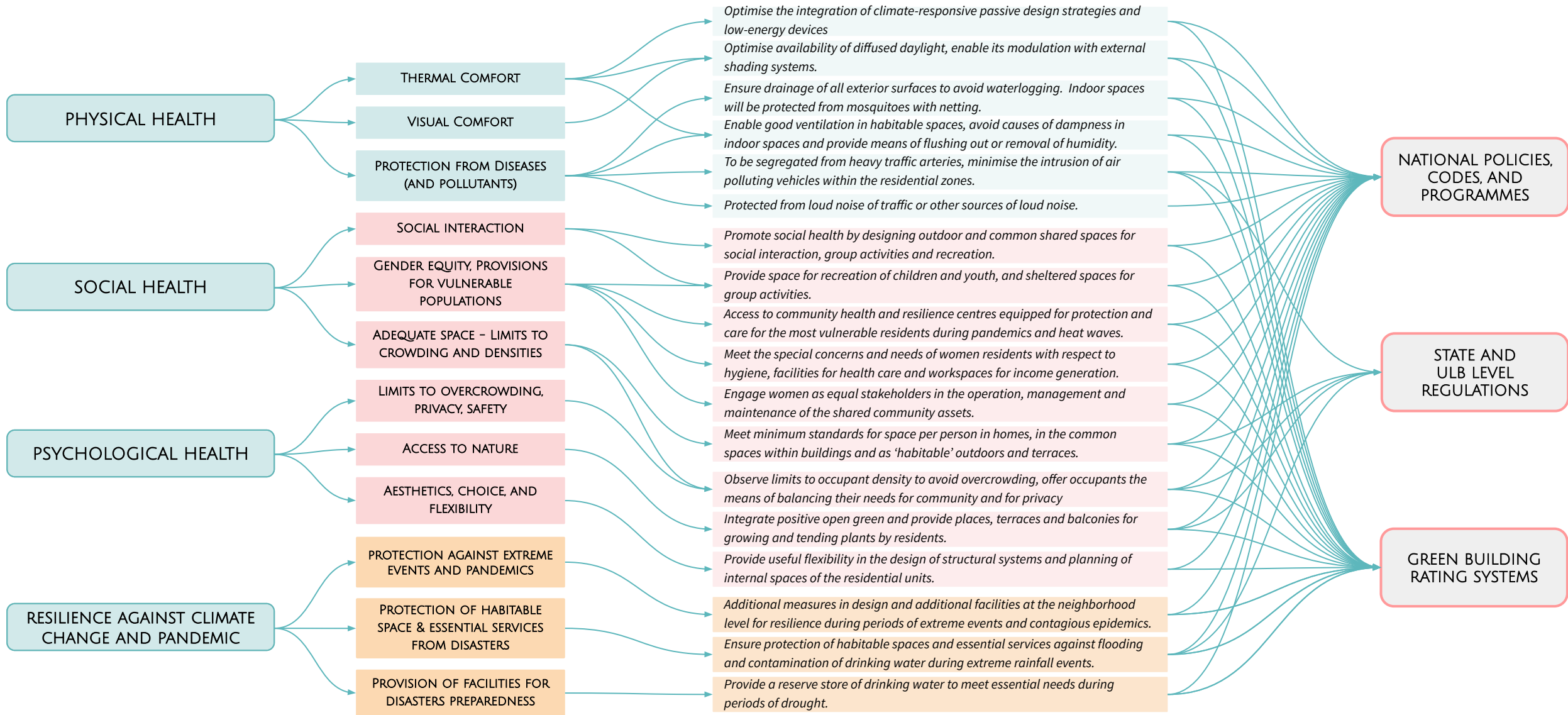
Healthy Building and its neighborhood will –

Have **additional measures in design** and **provision of additional facilities** at the neighborhood level, as a measure for **resilience** during periods of extreme events and contagious epidemics.

Ensure **protection of habitable spaces and essential services** against flooding and contamination of drinking water during extreme rainfall events.

Provide a **reserve store of drinking water** to meet essential needs during periods of drought.

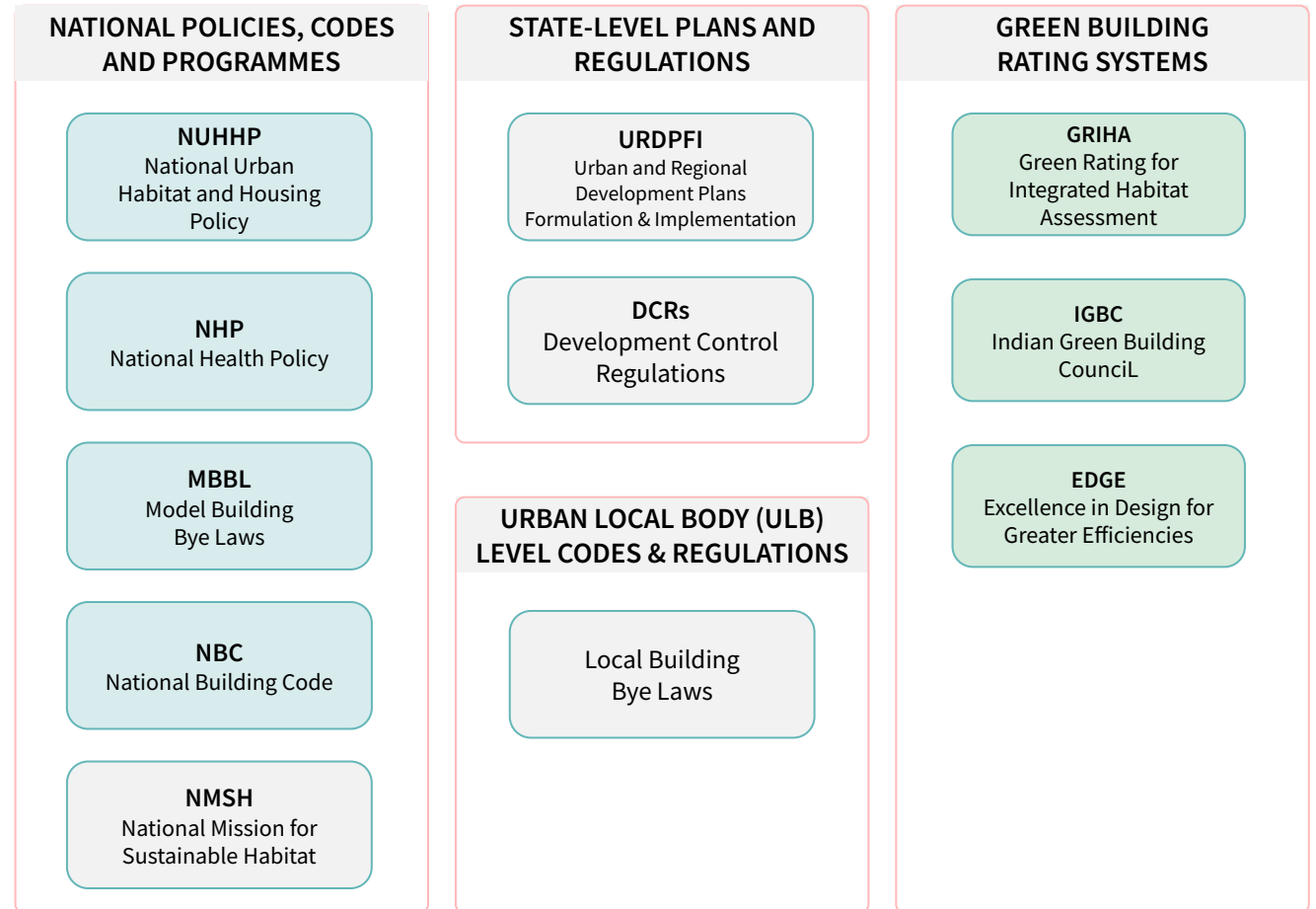
(Image Source: Helen Farley, Kelley Johnson, Eva Leung, and Jackson Lindsay)



4. RECOMMENDATIONS

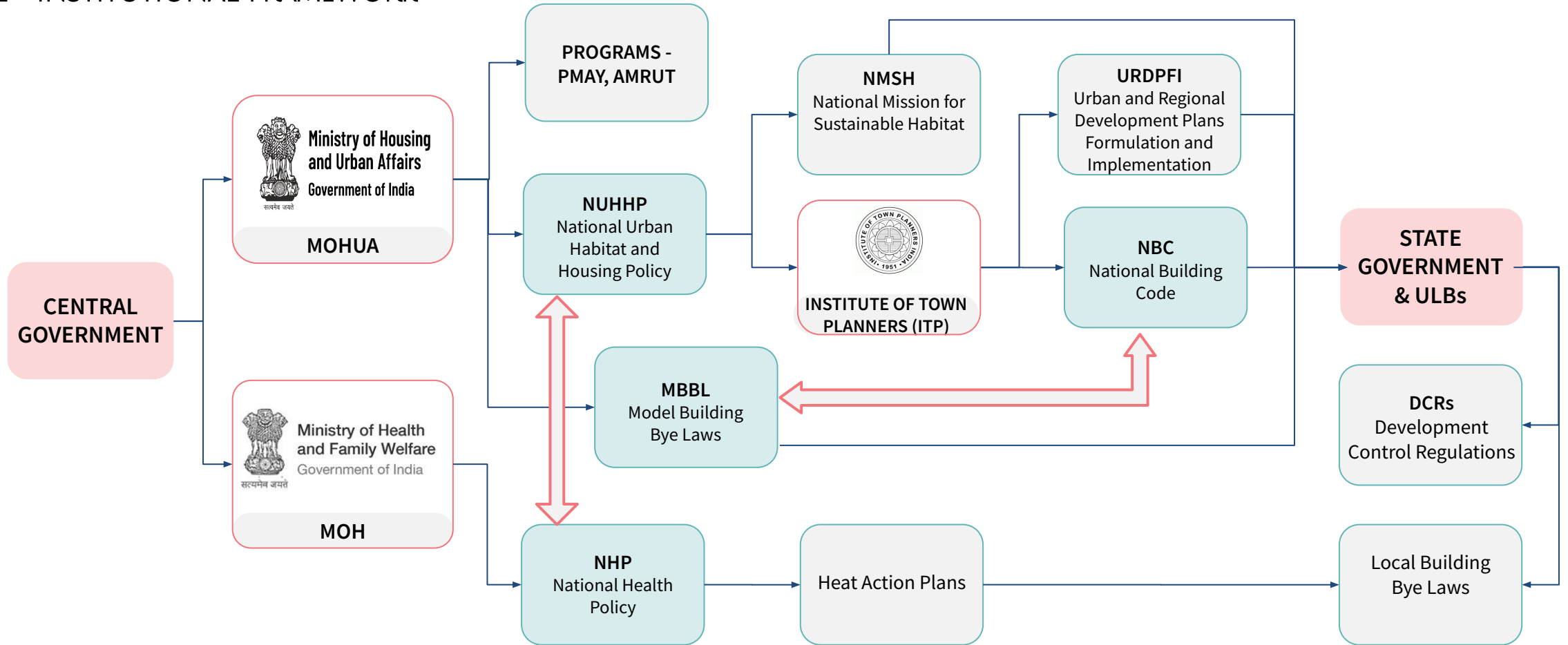
4.1 HARMONISING DESIGN GUIDELINES

- Align the objectives of the **National Urban Habitat and Housing Policy (NUHHP)** with the **National Health Policy (NHP)**.
- Coordinated extension of **NBC** and **MBBL** - to incorporate aspects of health and wellbeing, and resilience to climate change - instituting mandatory provisions for execution by ULBs.
- The **PMAY**, flagship mission for housing, expected to extend further, awaits reformulation for the coming decade.
- This paper strongly recommends that the minimum standards for PMAY (U) bring **all forms of group housing under an upgraded NBC and MBBL** which would dedicate a special section to **affordable housing**, including objectives of **health and well-being**, in the context of **climate change**.



4. RECOMMENDATIONS

4.2 INSTITUTIONAL FRAMEWORK



4. RECOMMENDATIONS

4.3 ROADMAP

- 1 Enhancement of and coordination between the **National Urban Habitat and Housing Policy (NUHHP)** and the **National Health Policy (NHP)**, in light of climate change mitigation and adaptation.
- 2 Setting guidelines for the enhancement of the **National Building Code (NBC)**.
- 3 Requesting the **Bureau of Indian Standards** to consider the guidelines in the awaited review process of the **National Building Code (NBC)**, particularly for sections on 'Low-income Housing' and 'Approach to Sustainability'.
- 4 **Model Building Bye Laws (MBBL)** to be developed for affordable housing and coordinated with the **National Building Code (NBC)**, in line with the **NUHHP**.
- 5 Requesting the Institute of Town Planners to enhance the **Urban and Regional Development Plans Formulation and Implementation (URDPFI)** Guidelines with special reference to urban affordable housing.

4. RECOMMENDATIONS

4.4 NATIONAL BUILDING CODE (2016)



RESILIENCE AGAINST CLIMATE CHANGE & PANDEMICS

PHYSICAL HEALTH

- Adherence to **Eco Niwas Samhita (ENS) Energy Conservation Building Code (ECBC) (R) for thermal comfort** – this could be made prescriptive, giving standard solutions for walling, windows, external shading and roofing, for ease of implementation
- Provision for mechanically aided **ventilation**
- Mandating **roof construction** with reflective coating and high insulation
- Provision for **roof mounted Solar PV** as a resilience measure
- Protection of homes from **mosquitoes** and vermin
- Design of on-site **drainage** for no stagnant water.
- **Minimum buffer** between land for affordable housing and major transportation arteries **to minimise pollution**
- Provision of **emergency water storage** at the community level
- Provision of **sheltered resilience centres**

4. RECOMMENDATIONS

4.4 NATIONAL BUILDING CODE (2016)

RESILIENCE AGAINST CLIMATE CHANGE & PANDEMICS

SOCIAL AND PSYCHOLOGICAL HEALTH

- Minimum standard for **accessible shared space**, sheltered or open, adjacent to homes as compensation for small dwelling units with high occupancy
- Prohibit **FAR** incentives that contradict **social and cultural appropriateness** and environmental sustainability.
- Inclusion of **women** in **post-occupancy management** of community assets as changemakers for sustainable lifestyles.
- **Limit to building heights** to **stilts plus four storeys** as a fundamental requirement
- **Limit to densities** of housing (DUs/hectare of land) to avoid overcrowding
- **Limit to hard paving** and vehicular access, minimum standards for **green and soft ground**
- Review of on- site provision of vehicular **parking** to **maximise green open spaces**
- Review of **fire tender** access rules to optimise **green open space**
- Recommendation for design to permit **flexibility** in partitioning of internal spaces

4. RECOMMENDATIONS

4.5 MODEL BUILDING BYE-LAWS (2016)



RESILIENCE AGAINST CLIMATE CHANGE & PANDEMICS

PHYSICAL HEALTH

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4. RECOMMENDATIONS

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4. RECOMMENDATIONS

4.6 DEVELOPMENT CONTROL REGULATIONS (2017)

RESILIENCE AGAINST CLIMATE CHANGE & PANDEMICS

PHYSICAL HEALTH

- **Minimum buffer** between land for affordable housing and major transportation arteries **to minimise pollution**
- Protection from **flooding** during extreme weather events

SOCIAL AND PSYCHOLOGICAL HEALTH

- **Limit to building heights** to **stilts plus four storeys** as a fundamental requirement
- **Limit to densities** of housing (DUs/hectare of land) to avoid overcrowding
- **Limit to hard paving** and vehicular access, minimum standards for **green and soft ground**
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- Review of **fire tender** access rules to optimise **green open space**

4. RECOMMENDATIONS

4.7 GREEN BUILDING RATING SYSTEMS

GREEN RATING FOR INTEGRATED HABITAT ASSESSMENT (GRIHA); INDIAN GREEN BUILDING COUNCIL (IGBC); EXCELLENCE IN DESIGN FOR GREATER EFFICIENCIES (EDGE)



RESILIENCE AGAINST CLIMATE CHANGE & PANDEMICS

PHYSICAL HEALTH

- Prescription on **cross ventilation**, and external **shading** of windows according to orientation
- Provision of **habitable outdoors** adjacent to dwelling units
- On-site **waste management** and recycling
- Provision for **roof mounted Solar PV** as a resilience measure
- Protection of homes from **mosquitoes** and vermin
- Ensuring on-site **drainage** for no stagnant water
- **Minimum buffer** between land for affordable housing and major transportation arteries **to minimise pollution**
- Provision of **emergency water storage** at the community level
- Provision of **sheltered resilience centres**
- **Protection from flooding** during extreme weather events

4. RECOMMENDATIONS

4.7 GREEN BUILDING RATING SYSTEMS

GREEN RATING FOR INTEGRATED HABITAT ASSESSMENT (GRIHA); INDIAN GREEN BUILDING COUNCIL (IGBC); EXCELLENCE IN DESIGN FOR GREATER EFFICIENCIES (EDGE)

RESILIENCE AGAINST CLIMATE CHANGE & PANDEMICS

SOCIAL AND PSYCHOLOGICAL HEALTH

- Provision of **social spaces** adjacent to dwelling units as secure spaces for women and girls
- Provision for on-site **community facilities**
- Provision for on-site, **home-based income generation** activities
- **Limits to building heights** and **densities** in affordable housing developments for cultural appropriateness and to avoid overcrowding
- Inclusion of **women** in **post-occupancy management** of community assets as changemakers for sustainable lifestyles.
- Design for **adaptability** and **flexibility** in the subdivision of internal spaces of dwelling units
- Distributing **green areas** among housing blocks for **connection with Nature** and for **safe places for children**

NEXT STEPS

FROM RECOMMENDATIONS TO TECHNICAL CLAUSES

- 1 Enhancement of and coordination between the **National Urban Habitat and Housing Policy (NUHHP)** and the **National Health Policy (NHP)**, in light of climate change mitigation and adaptation.
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- 5 Requesting the Institute of Town Planners to enhance the **Urban and Regional Development Plans Formulation and Implementation (URDPFI)** Guidelines with special reference to urban affordable housing.

NEXT STEPS

FEEDBACK FOR IMPROVEMENT

→ IMPROVING THE WHITE PAPER

Feedback from webinar participants is requested - to improve and expand the white paper.

→ TESTING FEASIBILITY

Check the feasibility of the recommendations - by demonstrating and integrating in 2 projects for Affordable Housing. The learnings from the process will inform the white paper.

(Image Source: Helen Farley, Kelley Johnson, Eva Leung, and Jackson Lindsay)

THANK YOU

More information:

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