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THE INDIAN INSTITUTE OF ARCHITECTS

INDIA



ARCHITECTS COMMITTEE ON SOCIAL RESPONSIBILITY ACSR ROUNDTABLE CONFERENCE IN HONG KONG

Organized by
THE HONG KONG INSTITUTE OF ARCHITECTS
14th September 2019 At L Hotel , Causeway Bay , Harbour View , Hongkong

Manguesh Raghunath Prabhugaonker (Official Delegate)
Sudhir Pillai Balakrishna (Past Chair Person)
T. S. Subbaiah (Member)
Sanjeev N. Bumb (Member)
Senthil Kumar Karunakaran (Member)



香港建築師學會
The Hong Kong Institute of Architects

Manguesh R. Prabhugaonker Official Delegate
(INDIA ACSR COMMITTEE)



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RESILIENT BUILDINGS

A PROMISING START

RESILIENT COMMUNITY

MOVING FORWARD COLLECTIVELY

RESILIENT CITIES

MOVING TOWARDS A CLIMATE

RESILIENT ASIA

RESILIENT ENVIRONMENTS

NATURAL AND BUILT

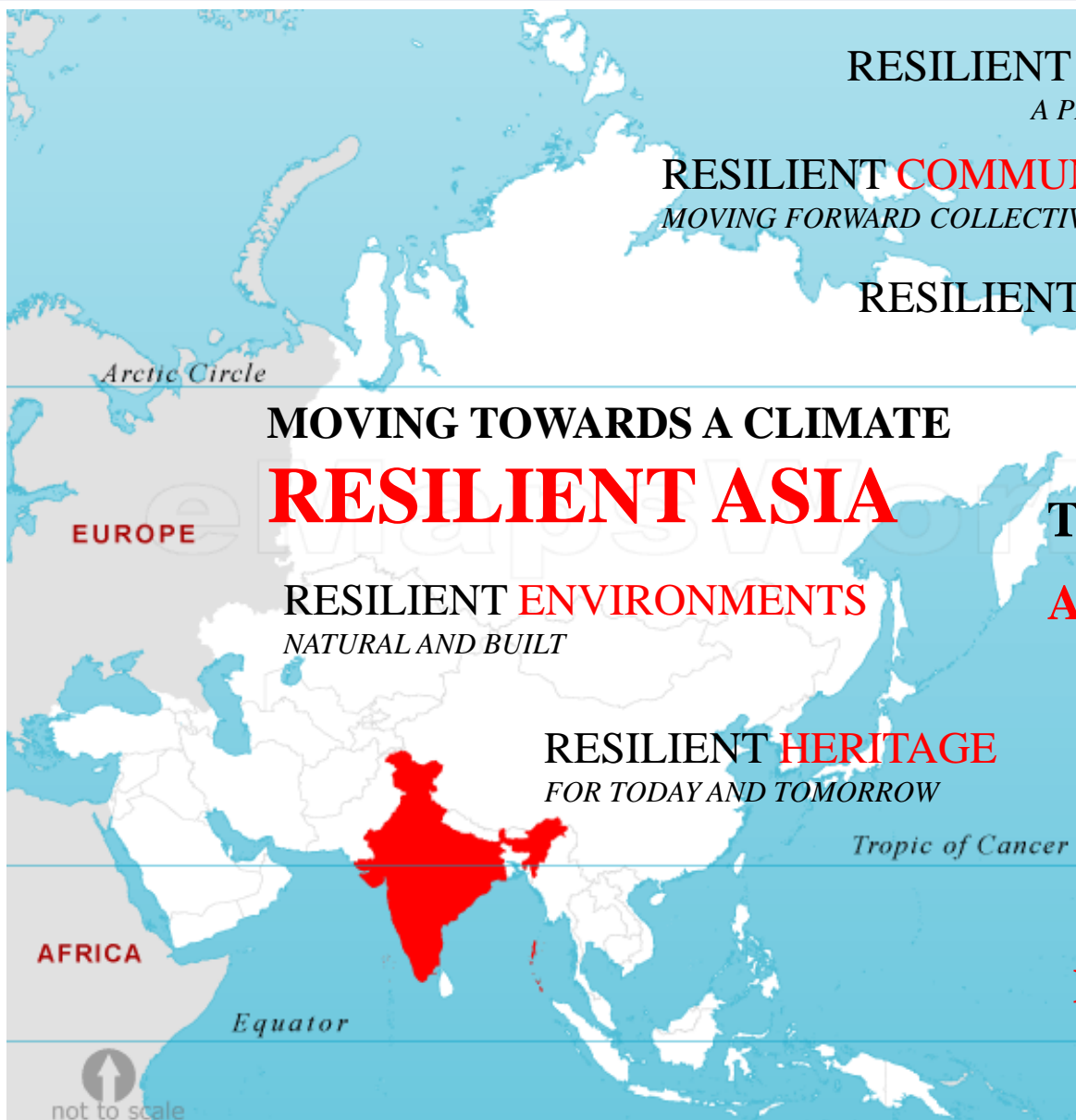
RESILIENT HERITAGE

FOR TODAY AND TOMORROW

VISION

To build a safe and disaster resilient Asia by developing a holistic, proactive, multi-disaster oriented and technology driven strategy through a culture of prevention, mitigation, preparedness and response in partnership with Arcasia

Mangesh R. Prabhugaonker Official Delegate (INDIA ACSR COMMITTEE)



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RESILIENT BUILDINGS

What is a resilient building in the Indian context?

India is divided into 6 broad climatic zones. Resilient buildings are those that are equipped to withstand the vagaries of the weather in their local climate.



A vernacular house in east coast



- ### Framework
1. CLIMATIC ZONES
 2. NATURAL & BUILT ENV.
 3. NATIONWIDE DISASTERS
 4. DISASTER MANAGEMENT
 5. EFFECTS ON PEOPLE
 6. GOVT. INITIATIVES
 7. OUR MISSION

- ENVIRONMENTAL RESILIENCE respecting our natural environment and context
- DISASTER RESILIENCE to be equipped for the worst while hoping for the best
- CLIMATE CHANGE RESILIENT adapting to the need of the hour
- ADAPTIVE REUSE to make the most of our limited resources
- ACTION PLANS for speedy response
- PEACEFUL COEXISTENCE between members of all professions and locals

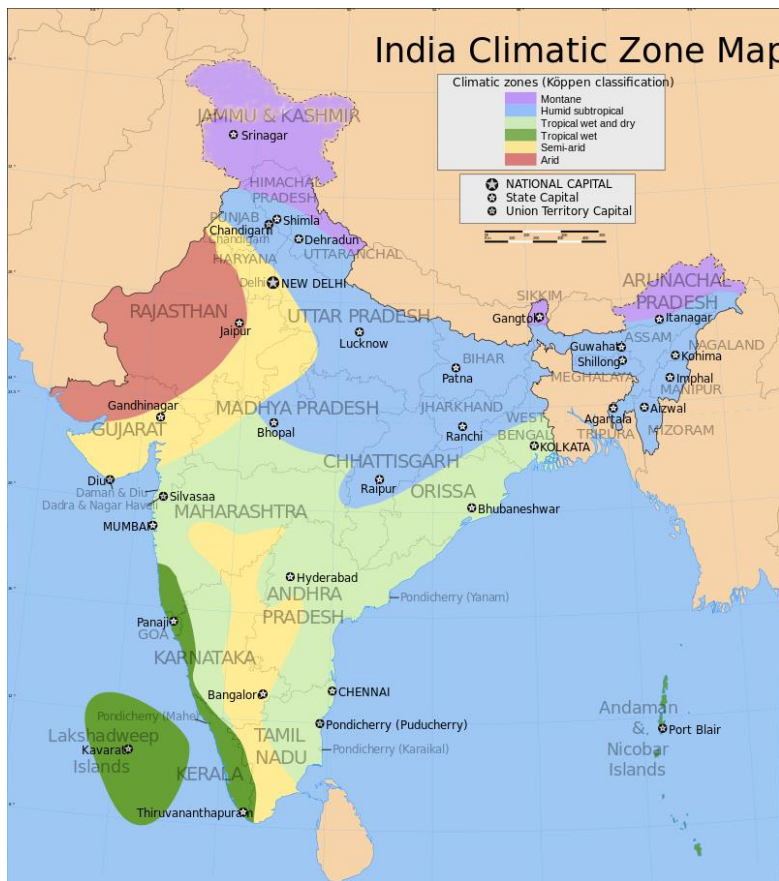
ApproachBEYOND JUST BUILDING REGULATIONS

MOVING TOWARDS SOCIALLY RESPONSIBLE ARCHITECTURE WITH CLIMATE RESPONSIVE DESIGN

CLIMATIC ZONES
 NATURAL & BUILT ENV.
 NATIONWIDE DISASTERS
 DISASTER MANAGEMENT
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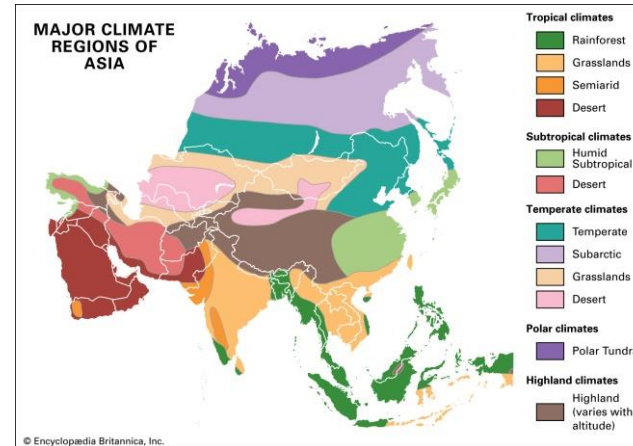


- Montane
- Humid subtropical
- Tropical wet & dry
- Tropical wet
- Semi-arid
- Arid



CLIMATIC ZONES

NATURAL & BUILT ENV.
 NATIONWIDE DISASTERS
 DISASTER MANAGEMENT
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With its landmass extending from Kashmir to Kanyakumari and Gujrat to Arunachal Pradesh, India has **an extremely diverse range of climatic conditions**

A LAND WITH DIVERSE CLIMATIC CONDITIONS REQUIRES DIVERSE SOLUTIONS

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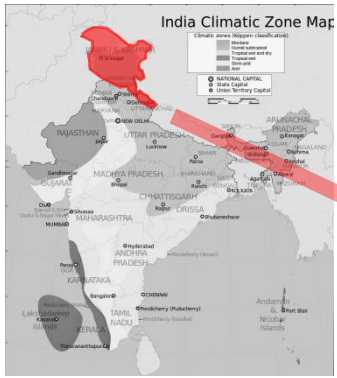


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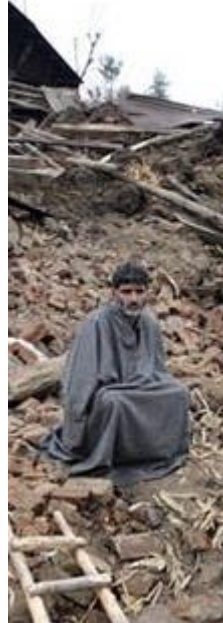
BUILDING TYPOLOGY IN MONTANE CLIMATE

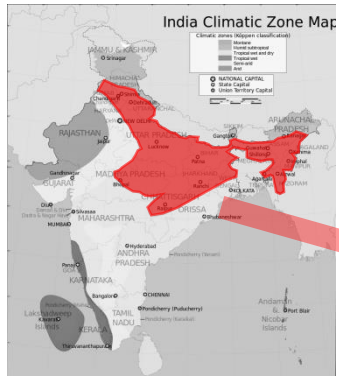


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Jammu & Kshmir
 SRINAGAR





BUILDING TYPOLOGY IN **HUMID SUBTROPICAL CLIMATE**



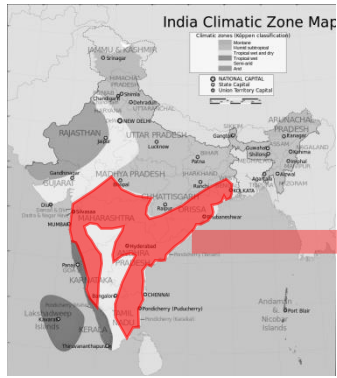
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PATNA Bihar

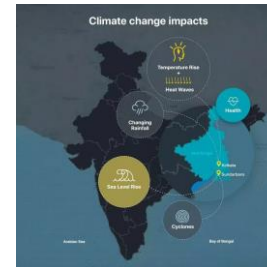




BUILDING TYPOLOGY IN **TROPICAL WET AND DRY CLIMATE**

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KOLKATA



POLL PLANS CHANGED: ₹235.5CR CENTRAL AID FOR STATE

RAIN WASHING
 The Government of West Bengal has approved a plan for rain washing in Kolkata. The plan involves installing rain washing systems in major roads to remove dust and debris. The estimated cost of the project is ₹235.5 crore. The Government of India has approved a central aid of ₹235.5 crore for the project.

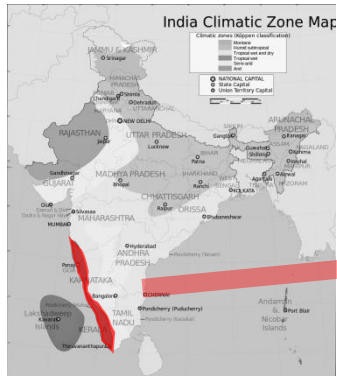
STREET WASHING
 The Government of West Bengal has approved a plan for street washing in Kolkata. The plan involves installing street washing systems in major roads to remove dust and debris. The estimated cost of the project is ₹235.5 crore. The Government of India has approved a central aid of ₹235.5 crore for the project.

CHANGE IN POLL CONTROL
 The Government of West Bengal has approved a plan for change in poll control in Kolkata. The plan involves installing air quality monitoring stations in major roads to monitor air quality. The estimated cost of the project is ₹235.5 crore. The Government of India has approved a central aid of ₹235.5 crore for the project.

EMERGENCY MEET
 The Government of West Bengal has called an emergency meeting to discuss the impact of climate change on Kolkata. The meeting will be held in the next few days.

FOR TOURISTS
 The Government of West Bengal has announced that it will provide special facilities for tourists in Kolkata. The facilities include discounted rates for hotels and transport services.





BUILDING TYPOLOGY IN **TROPICAL WET** CLIMATE

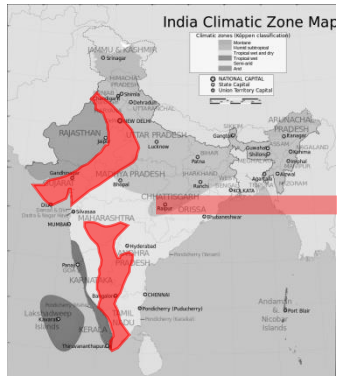


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KERALA





BUILDING TYPOLOGY IN SEMI ARID CLIMATE

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BANGALORE



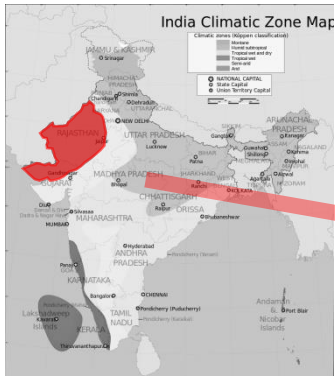
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BUILDING TYPOLOGY IN **ARID CLIMATE**



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RAJASTHAN



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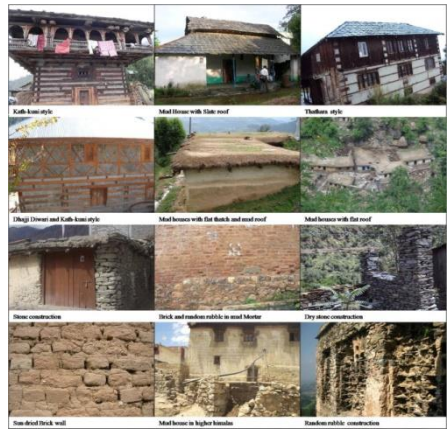
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Building types of Jammu and Kashmir



Tak, refers to load bearing masonry piers with infill walls. In many cases these are expressed by a different use of material. The piers may be made of stone and infill walls of brick. Timber runners at each level tie the walls. The infill walls have timber embedded in them to increase their elasticity.



Building types of Patna



Measures currently taken:
 Appropriate orientation | Insulation of building envelope | Air locks, balconies, lobbies, verandahs Overhangs | Fins | Protective tree cover
 Windows and Exhausts
 Wind towers | Courtyards
 Water bodies and evaporative cooling methods



Building types of Kolkata



Measures currently taken: Roof and wall insulation
 Roofs with reflective surfaces
 Ventilated roof construction
 Maximum cross ventilation provided
 Anti-corrosive coatings on materials



BUILDING MATERIALS—RESILIENT CONCEPTS WITH CONSTRUCTION TECHNIQUES

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Building types of Kerala



Measures currently taken:
Roof and wall insulation
Roofs with reflective surfaces
Ventilated roof construction
Maximum cross ventilation provided
Anti-corrosive coatings on materials



Building types of Banglore



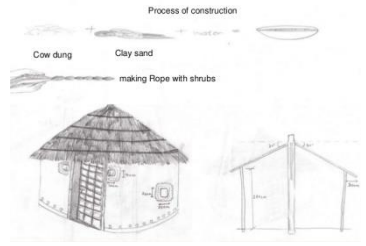
Measures currently taken:
Air locks, balconies
Wind barriers, protective tree cover
Thick walls
Dehumidifiers and Desiccant cooling
Ponds for evaporative cooling
Roof and wall insulation



Building types of Raiasthan



Measures currently taken:
Appropriate orientation | Insulation of building envelope | Air locks, balconies, lobbies, verandahs
Overhangs | Fins | Protective tree cover
Windows and Exhausts
Wind towers | Courtyards
Water bodies and evaporative cooling methods



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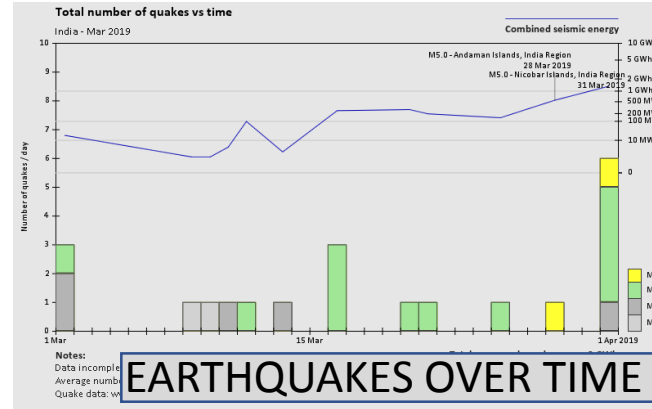
DAILY COMMUTE IS
DISRUPTED



Map 1
EARTHQUAKE ZONES IN INDIA



**COMES WITHOUT
WARNING**
MASSIVE LOSS OF LIFE
AND PROPERTY
ARE WE PREPARED?



EARTHQUAKES

Zone I - Very High Damage Risk Zone (MSK VI)
Zone II - High Damage Risk Zone (MSK V)
Zone III - Moderate Damage Risk Zone (MSK IV)
Zone IV - Low Damage Risk Zone (MSK III or less)

Source: BMRP Vulnerability Atlas

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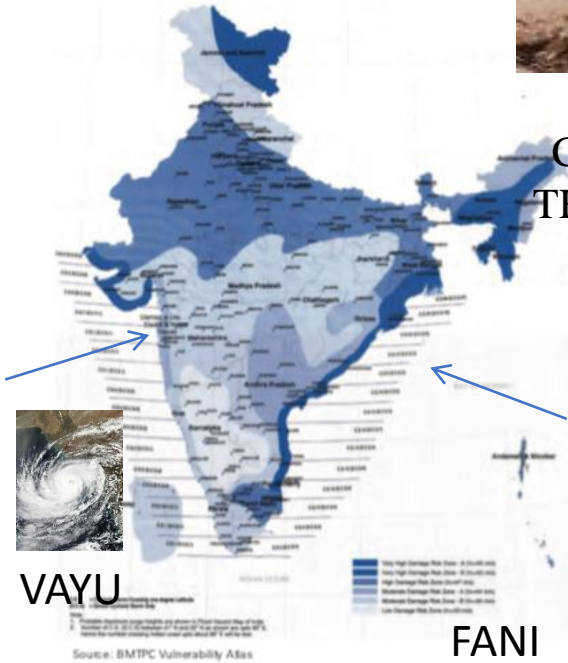




**CYCLONE FANI: A
CATASTROPHE IN ODISHA
OVER 1 MILLION PEOPLE
EVACUATED
879 MULTIPURPOSE CYCLONE
SHELTERS IN ODISHA**

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Map 3
WIND AND CYCLONE ZONES IN INDIA



**CYCLONE VAYU-
THE WEST COAST
OF INDIA
300,000
EVACUATED**



CYCLONES

HOMES FOR THE EVACUEES? NEW, OLD?

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CAN WE TAKE PRECAUTIONARY DESIGN MEASURES IN FLOOD PRONE AREAS?

KERALA FLOODS

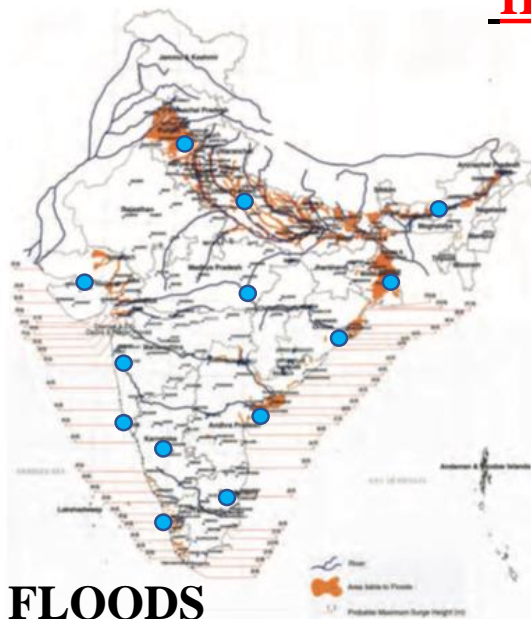


Water level had crossed the maximum storage capacity of reservoirs of 24 out of the state's 58 dams, forcing officials to release the water by opening the sluice gates, including three of the Idukki reservoir.

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Map 2 FLOOD ZONES IN INDIA

HOW MANY FLOODS TILL WE TAKE A STAND?



Damage to crop, property in Kerala floods pegged at ₹8,000 crore so far

STATE SEES 37% EXTRA RAIN SINCE JUNE

Worst-hit areas

Relief from heavy rains expected from 15th

2,182 injured, 88 deceased

Landslides

Why 2018 is the worst

Relief measures

12 more NDRF teams



OTHER STATES AFFECTED ADVERSELY
GUJRAT | MADHYA PRADESH
MAHARASHTRA | KARNATAKA
ODISHA | GOA | TAMIL NADU
ANDHRA PRADESH | PUNJAB

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Map 4
LANDSLIDE AFFECTED STATES



LANDSLIDES
BLOCK HIGHWAYS
PEOPLE BURIED
UNDER RUBBLE
VEHICULAR MOVEMENT
DISRUPTED



LACK OF RETAINING WALLS?
POOR INFRASTRUCTURE
OR FLAWED DESIGN?
WHO IS TO BLAME?

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LANDSLIDES



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HUMANITY AT THE RECEIVING END

Devastating loss of life and livelihood

Who is to be blamed for failure of structures?



What can architects do?

What is our social responsibility?

SHELTER IS A BASIC **HUMAN** NEED

Respecting A **HOME** with socio cultural **CONNECT** with the place

NEED TO SUCCESSFULLY MEET **HUMANITARIAN NEEDS** AND **PROTECT** THE **VULNERABLE** AFTER DISASTERS.



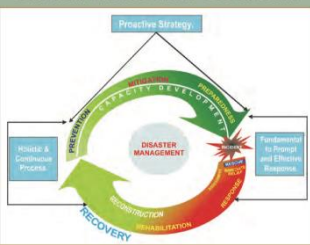
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WHAT IS OUR RESPONSE TO THESE DISASTERS?

A DIRECTION FROM STATE POLICIES ?

ARCHITECT'S RESPONSIBILITIES TOWARDS OUR PEOPLE

APPROACH

A holistic and integrated approach towards disaster management with emphasis **on building strategic partnerships at various levels.**

The themes

-**Community based DM**, including integration of the policy, plans and **execution.**

-**Capacity development** in all spheres. **Multi-sectoral synergy.**

-Consolidation of **past initiatives and best practices.**

-**Cooperation & Coordination** with agencies at National and International levels.



CHOICES & RISK



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OBJECTIVES with framework

PROMOTING A CULTURE OF PREVENTION, PREPAREDNESS AND RESILIENCE AT ALL LEVELS THROUGH **KNOWLEDGE, INNOVATION, AND EDUCATION** IN **SUSTAINABLE CONSTRUCTION**

Encouraging mitigation measures in building construction based on technology, **traditional wisdom** and **environmental sustainability**.



*Vernacular homes in Arunachal Pradesh(left, prone to flooding) and in Kashmir(right, earthquake prone) have been built over the years with in-depth knowledge of resilient **construction techniques***

CLIMATE RESPONSE



Mainstreaming disaster management into the Architecture education , **civil developmental** and **town planning** process.

-Ensuring efficient mechanism for identification, **assessment and monitoring** of disaster risks.

-Ensuring efficient response and relief with a caring humanitarian approach

-Undertaking **reconstruction as an opportunity**

to **build disaster resilient** structures and habitat for ensuring safer living.

*Focus on delivering durable, more permanent housing solutions post disasters for a dignified and safe shelter the **residents can call home.***

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URBAN FLOODING

CHILDREN'S / HEALTH - FUTURES ARE SEVERELY IMPACTED BY DESTRUCTION. IMPROPER DESIGN, UNSAFE CONSTRUCTION WORSENS THE SCENARIO

BY CONTINUING WITH CURRENT TRENDS, CAN WE RECONCILE WITH THIS?

IMPROPER INFRASTRUCTURE, DRAINAGE PATTERNS... WHERE IS THE ACCOUNTABILITY?

NEED FOR A FRAMEWORK TO PENALISE THOSE RESPONSIBLE FOR NEGLIGENCE?

ANY DELAY IN RELIEF, DELAY IN CONSTRUCTION OF TEMPORARY HOMES ADDS TO THE AGONY



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GOVERNMENT OF INDIA DISASTER MANAGEMENT INITIATIVES



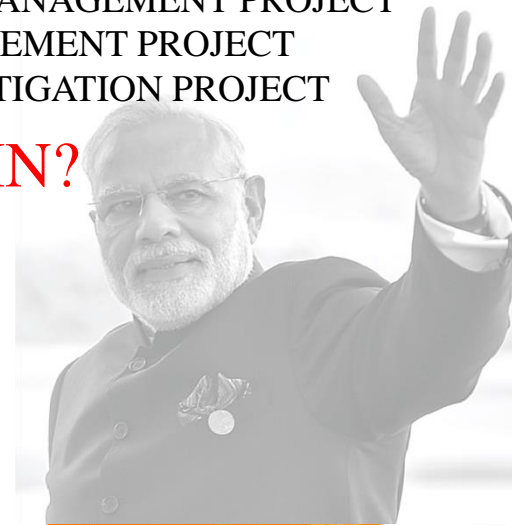
- **DISASTER MANAGEMENT ACT**
- **NATIONAL POLICY ON DISASTER MANAGEMENT (NPDM)**
- **NATIONAL PLAN FOR DISASTER MANAGEMENT**
- **NATIONAL ACTION PLAN ON CLIMATE CHANGE**
- **NATIONAL EARTHQUAKE RISK MITIGATION PROJECT**
- **NATIONAL CYCLONE RISK MITIGATION PROJECT**
- **INTEGRATED COASTAL ZONE MANAGEMENT PROJECT**
- **NATIONAL FLOOD RISK MANAGEMENT PROJECT**
- **NATIONAL LANDSLIDE RISK MITIGATION PROJECT**

WHERE DO ARCHITECTS COME IN?

NATIONAL BUILDING CODES & ITS PRINCIPLES GUIDELINES

MEET CHALLENGES POSED BY NATURAL CALAMITIES

USE OF STATE OF THE ART AND CONTEMPORARY PRACTICES WITH SUSTAINABLE



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SHORT TERM Temporary Livelihood Options and Socio-Economic Rehabilitation

- Generate temporary livelihood options for the affected community
- Ensure that the assets, infrastructure and amenities created are **hazard resistant**, durable, **sustainable**, and **cost-efficient**.

LONG TERM Provision of Intermediate Shelters

- Where extreme weather conditions can be life-threatening or when the period of stay in temporary shelters is likely to be long and uncertain, construction of intermediate shelters with suitable sanitary facilities should be undertaken to ensure a **reasonable quality of life**.
- The **design** of such shelters should be **eco-friendly** and in consonance with **local SOCIO cultural framework**.



Pre-fab homes at under 25000INR (\$350 approx.)

were provided in Kerala by Bengaluru based 'Project Vision'

Can be installed by 2 persons in 2 hours



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सत्यमेव जयते

Prime Minister
National Relief Fund

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COST EFFECTIVE ELEVATED STEEL HOUSES BUILT IN KUTTANAD, KERALA

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IIA HELPS OUT IN KERALA!



Impact on critical infrastructure

1. Landslides and floods have caused damage to at least 10,000km of roads, hampering humanitarian access
2. The power has been shut down in some of the affected areas.
3. Destruction of infrastructure was also reported, most notably a concrete bridge was completely destroyed, leaving almost 3,500 people completely isolated and impossible to access.
4. 54,000 homeless, at least 400 dead.

A NEW HOPE...

LOW COST HOUSING

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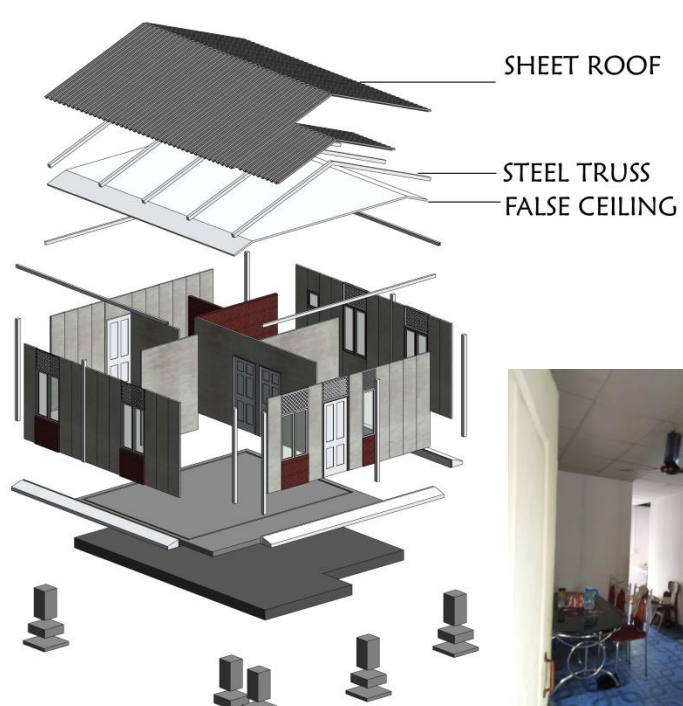




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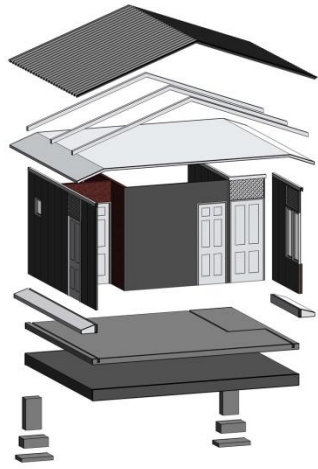
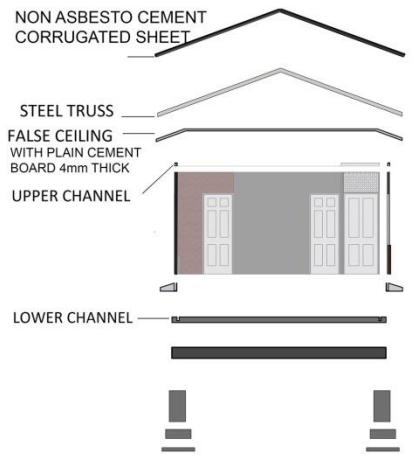




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A SOLUTION TO **AVOID DISLOCATION** DURING FLOODING



Elevated houses on steel frames are proposed for the flood affected areas. **The idea is to avoid relocation of the inhabitants during flooding.**

The Foundation is of RCC, Footing kept **4' below the existing ground level**, to ensure proper anchorage into the ground.

The superstructure is made of **steel and aerated concrete panels 1X3m**, to make the structure **as light as possible.**

The structure is so designed that it can be prefabricated and erected at the site within **30days.**

Ensured that the superstructure is sturdy enough to take calamities like flooding, Earthquake etc.

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CONSTRUCTION PROCESS_

COMPLETE IN 30 DAYS

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PLANS FOR 1 & 2BHK



PANEL SETUP



EXCAVATION



FOOTING



PLINTH BEAM

STEEL FRAMEWORK



HUMANE LIVING
 CONDITIONS



**PROVIDING SPEEDY
 RELIEF IN TIMES OF
 NEED**

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ROLE OF ARCHITECT...AS A SOCIAL RESPONSIBILITY

RESILIENT HOUSING PRE CRISIS, AFFORDABLE HOUSING POST CRISIS



Making Architecture **sustainable & Resilient to climatic responses / disasters .**

planning for- **individual building / with people and community**

Time to view **emerging built form keeping resiliency in mind beyond just regulations /legislations**

Explore and strategize the character of architectural language --**through built environment and innovative construction techniques w r t Building materials for the future**

Sensitizing the stake-holders in terms with **governance ,legislation and regulation with active involvement and risk awareness INSTEAD OF JUST STATISTICS**



World Architecture Day
7th October 2019

How can architects contribute to the realisation of affordable housing for all Readaptive use ?

RESILIENT **BUILDINGS**

Measures we can take as **ARCHITECTS**
SHORT TERM measures LONG TERM GOAL

RESILIENT **COMMUNITY**

RESILIENT **ENVIRONMENTS**

MAKE HUMAN SETTLEMENTS
**SAFE, INCLUSIVE,
RESILIENT AND SUSTAINABLE**

RESILIENT **HERITAGE**

**“ARCHITECTURE...
HOUSING FOR ALL 2022 ”INDIA**

Mangesh R. Prabhugaonker Official
Delegate
(INDIA ACSR COMMITTEE)



ACSR
ARCHITECTS COMMITTEE ON SOCIAL RESPONSIBILITY

IIA
THE INDIAN INSTITUTE OF ARCHITECTS





Presentation
Assistance by
Ashley D'costa
Mangesh Sajjnar

VISION
To build a safe and **disaster resilient Asia** by developing a **holistic, proactive, multi-disaster oriented and technology driven strategy** through a culture of **prevention, mitigation, preparedness and response in partnership with Arcasia**



Mangesh R. Prabhugaonkar Official Delegate (INDIA ACSR COMMITTEE)

Framework . SOCIALLY RESPONSIBLE ARCHITECTURE , CLIMATE RESPONSIVE DESIGN, PEOPLE CENTRIC.....towards Resilient Architecture in Natural & Built Environment a way forward at ARCASIAlets make a RESILIENT ASIA

